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DECEMBER 17, 1942

Alcan Highway

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By HAROLD W. RICHARDSON

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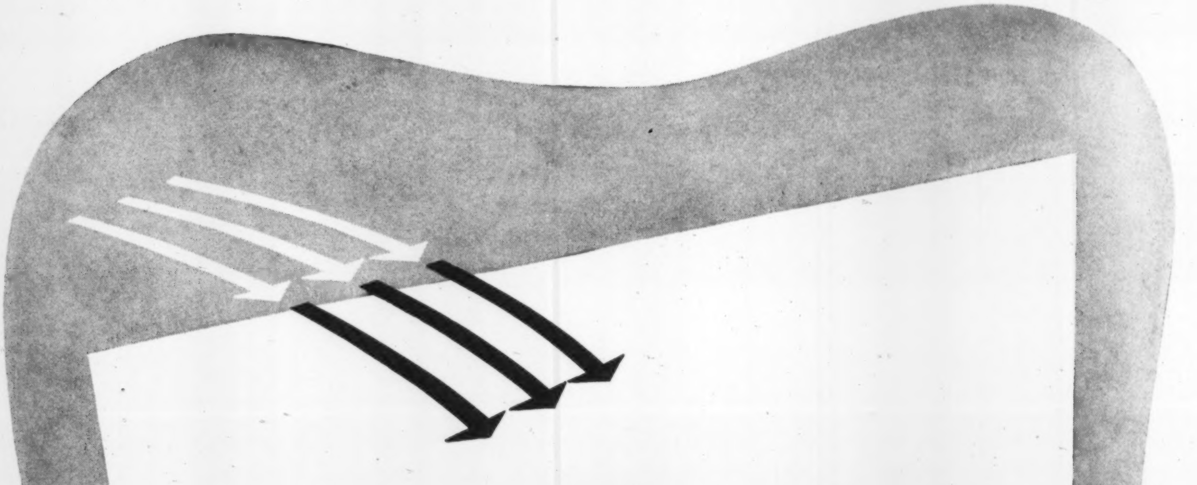

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Vol. 129 DECEMBER 17, 1942 No. 25

COMING NEXT

• Alcan Highway—Part II, covering the problems of supply, living and working conditions along the 1,800-mile route as outlined in this issue. Written in the intimate style of *ENR's* Harold W. Richardson, the first person—either army officer or civilian—to travel the full length of the highway, the story reveals many dramatic incidents of human interest, as well as a thorough analysis of the engineering problems.

• As in the days of World War I, the building of large concrete seagoing ships has become an important construction industry problem. Today, advanced construction methods, prefabricated forms, and new techniques in pouring procedure are being employed to speed construction. How a Pacific Coast yard is handling the problem will be described.

• Construction of 750,000 sq. yd. of 6-in. soil-cement paving in only 49 days for an airbase in a desert is a story of men, machines and Yankee ingenuity at work to meet the demands of war. Outlined are step-by-step methods employed in the field and for the testing work.

• When Asbury Park, N. J., decided to expand its water supply facilities trouble began from the moment bids were opened. The trials and tribulations of city engineer Carlton M. Roberts are detailed in his "Diary on a Deep Well Drilling Job".

ANNUAL HIGHWAY NUMBER

• Problems facing engineers of the state highway departments will be discussed in the Annual Highway Number, January 14. Leading off will be a statement by Thomas H. MacDonald, head of the Public Roads Administration, on the national problems. Mr. MacDonald will pay special attention to the serious effect on highway maintenance caused by public failure to recognize that large sums must be spent on our highways if they are to carry war-generated traffic safely and efficiently. Also included in the highway number will be articles on highway maintenance under war conditions and reports on the recent meeting of the Highway Research Board and American Association of State Highway officials.

PAGE

The Week's Events 51
Reader Comment 59
Editorials 60
Structural Tile Barracks for the WAACS 62
Blimp Hangers Built by Contrasting Methods 65
Roads Under War Restrictions—IV 71
Landfill Disposal Wins Army Favor 75
Big Concrete Plant Speeds Power Dam 78
Alcan Highway—America's Glory Road 81
Unit Prices 99
New Aids to the Constructor 100
Manufacturers' Activities 103
New Manufacturers' Publications 116
Men and Jobs 124
Meetings 128
Trends in the News 132
Construction Reports 143

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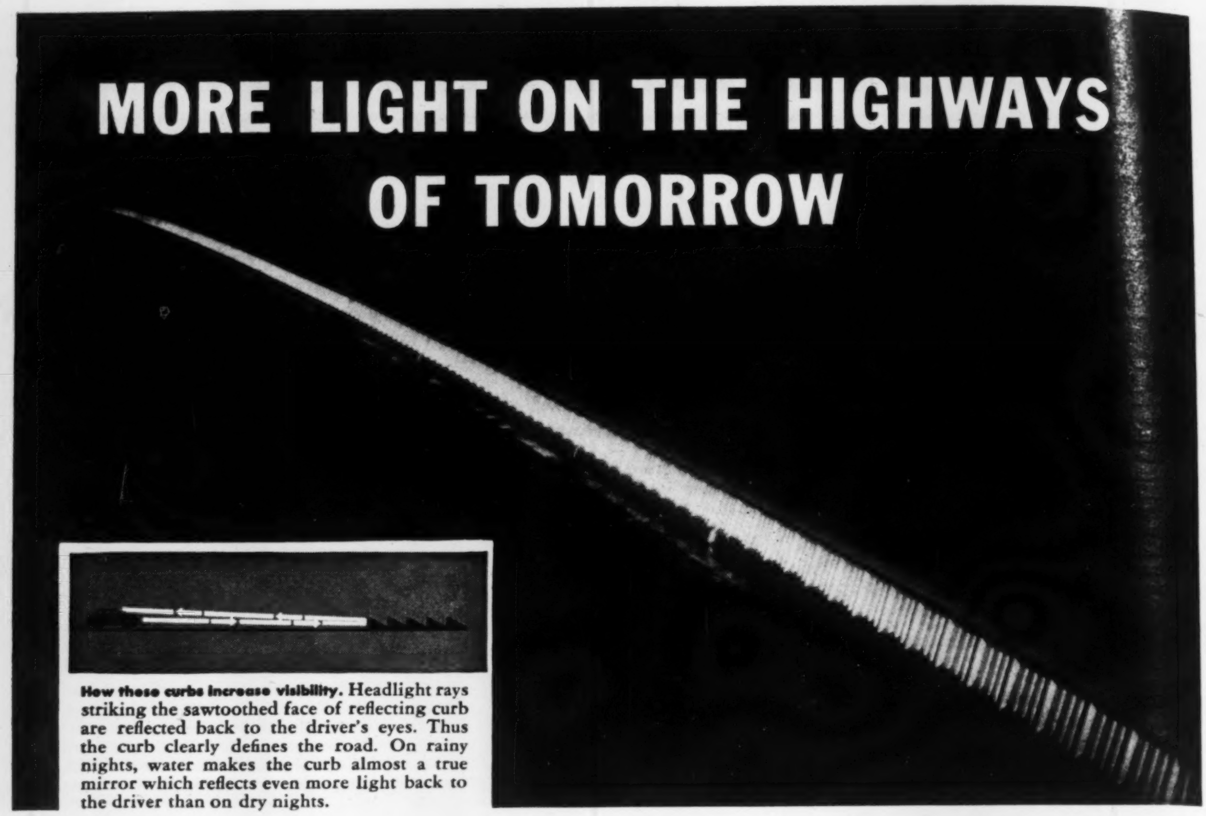

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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • DECEMBER 17, 1942 • VOLUME 129 • NUMBER 25

WMC approves interim plan on construction workers draft

"Replacement schedule" to serve industry until more elaborate "manning table" can be adapted. Details for obtaining deferments for essential workers outlined

There is as yet no ready method by which construction men may make use of the War Manpower Commission's elaborate manning tables (*ENR*, Nov. 12, p. 667) to smooth out the movement of construction workers into the armed services. The manning table plan was primarily designed for manufacturing plants with a reasonably constant labor force. WMC is now working with contractor organizations trying to adapt the plan to construction employers, but has not made much progress.

Last week, however, WMC approved an interim procedure—the replacement schedule—by which contractors, engineers, and other employers can obtain the advantages of a manning table as far as draft deferment is concerned. Use of the manning table requires a rather elaborate study of the whole personnel policy of the employer; including employment of women, estimates of future requirements, training programs, etc. The replacement schedule, on the other hand, is merely a list of draftable men with a schedule of the minimum times in which they can be drafted in an orderly fashion. When it is approved by state Selective Service officials, it is used as a basis for appeals to draft boards for occupational deferments.

Introduction of the replacement schedule idea does two things. It provides a quick way of getting consideration of an employer's total draft deferment problem. And it tacitly changes the basis of occupational deferment. Up to now, a man has been eligible for deferment if (1) he worked in an essential industry, and (2) he held a job in that industry requiring skill and substantial training.

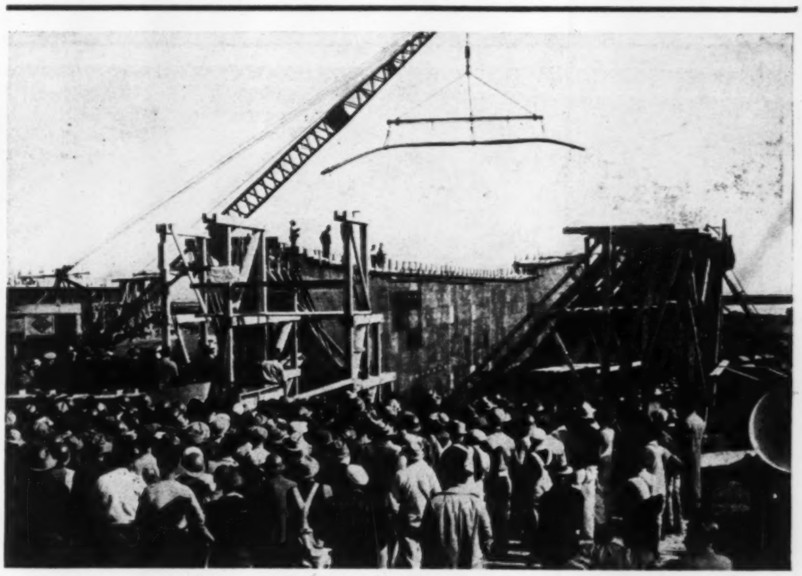
Any firm in an essential industry may prepare a replacement schedule—and construction is recognized as such an industry. First step is to obtain from all employees data on: job title, age, local board number, draft number and classification, family status. Then a "replacement summary" can be prepared listing by jobs all employees, showing how many are (1) women, (2) men not immediately liable to be drafted because of age, 4-F draft classification, or because they have children (children born more than nine months after Pearl Harbor are not counted), and (3) men likely to be drafted.

Next step is preparation of a "replacement list". This is a list, by name, of those men who fall in the draftable group, and the time required to replace each one. This will depend not only on the time required to replace a single man by training, up-grading, or recruiting, but also on the rate at which the firm can carry on replacement. For example, it may take about three months to train a sub-foreman, but if the employer feels able to have only two men in training at a time, the schedule might provide for replacing one man in three months, another in four, etc. Wherever such staggered replacement arrangements are used, the order of replacement should be determined by replacing single men first, in the order of their draft order numbers, then married men according to their draft numbers (wives acquired after Pearl Harbor don't count).

When the two documents constituting the replacement schedule are finished they are submitted for approval to the state director of Selective Service.

If the schedule is approved, it will be given an approval number so indicating. Then the employer will submit to the local boards a form 42A (request for class II deferment) for each of the men on his replacement list. For each man, he will request deferment until the month indicated on the approved replacement list, and will include the approval number of his replacement schedule.

Draft boards, legally autonomous, are not bound to grant the deferment so



Concrete ship construction starts at San Francisco

First steel reinforcing bars are lowered into concrete forms at a shipyard near San Francisco where Barrett and Hilp, general contractors, are carrying out a contract for 26 ship-type barges for the U. S. Maritime Commission.

There are two contracts, both held by the same firm, one for construction of six basins with other shipbuilding facilities, and the second for building the barges themselves. Each barge has cargo capacity of 5,000 tons.

requested, but they are expected to do so in most cases.

Approval now of the new scheme was made possible by the President's order giving increased authority over manpower to Paul McNutt. By bringing the Selective Service under WMC, this order ended a jurisdictional dispute that had been holding up the plan.

The order has several other effects on the draft situation. Most immediately felt will be the ban on voluntary enlistment in the armed services. Many employers have lost more men by enlistment than by the draft. Moreover, regardless of the number of men involved, losses by enlistment come in a haphazard, uncontrolled way, much more difficult to adjust to the Selective Service procedures.

A less immediate effect of drafting men for the Navy is that it speeds the day of "special calls." Present procedure is for the military to tell Selective Service that it wants so many men meeting physical qualifications in a given month. It has always been recognized that it might sometime become necessary for the services to ask for so many men of a particular skill. The Navy needs a higher percentage of skilled men than the Army. It has obtained them in the past by selective enlistment. Now it may have to resort to such "special calls."

How this will be done is still uncertain. Probability is that some system for picking men where they can be most easily spared will be developed rather than simply assigning quotas to local draft boards.

Highway bureaus see drop in revenues as gas rationing becomes nationwide

Department heads forsee tax losses as nation's automobile travel is cut by restriction; forward plans to cope with emergency

With the advent of nationwide gasoline rationing last month, and the resulting drop in highway department revenues, officials in many states heretofore untouched by this phase of the war's restrictions, look apprehensively to the future in their field.

The Public Roads Administration, at Washington, D. C., released an estimate that traffic on rural roads during December—the first month of nation-wide mileage rationing, will be 35 to 40 percent less than a year ago.

The PRA estimate was made on the With the advent of nationwide gasobasis of monthly automatic traffic records obtained from various state highway departments over the past several months. These records show that in the area that has already been rationed for some months, traffic decreases on rural roads, compared with corresponding months a year earlier, were 40 percent in October, 43 in September, 49 in August, 41 in July and 38 in June.

PRA also announced that October tax collections on motor fuels went down about 32 percent in the rationed area and about 17 percent in the unrationed area, compared with the same months in 1941.

With an eye on that situation Chairman William E. O'Brien of the Wisconsin State Highway Department informed Governor Elect Orland S. Loomis last week that highway revenues for the next two years will not be sufficient to meet statutory costs of the department.

O'Brien said it would be necessary to make up the deficit by dipping into the state's general funds. In this way, some of the $46,888,000 heretofore diverted from highway funds for general state purposes would come back home, O'Brien added. The commissioner said that revenues from motor vehicle registration and motor fuel taxes in the fiscal year ended June 30, were $36,072,000. He estimated that revenues for the current fiscal year will be about $25,000,000.

In Kentucky, where a state tax of 5 cents a gallon on gasoline has been the bulwark of road revenues since 1926, the officials conceded the seriousness of the situation but were unworried.

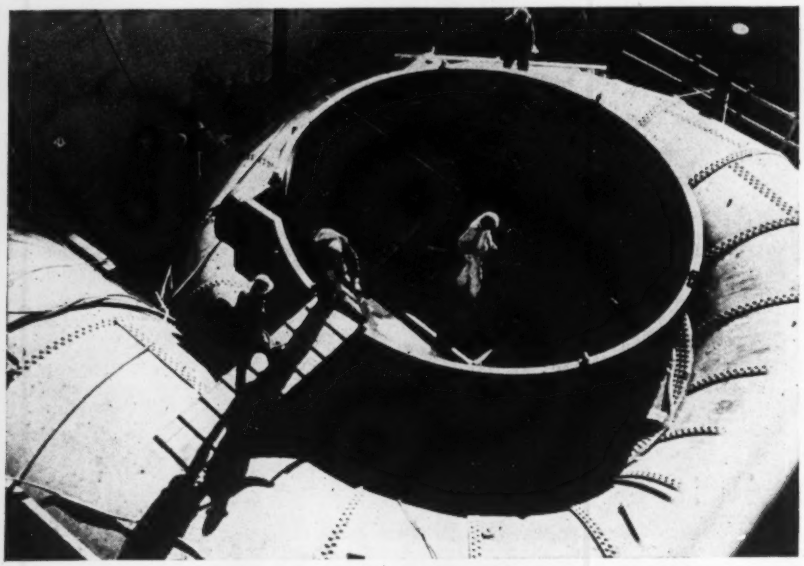
Commissioner of Highways J. L. Donaldson said that while he could not make any estimate as to how much the tax receipts will drop, he believed a considerable part of the effect has already been discounted by drastic curtailment in non-essential driving. In view of the fact that the highway department has no bonded debt, Donaldson said he believed his organization would weather the storm satisfactorily.

Cylon W. Wallace, registrar of motor vehicles, reported to Ohio Director of Highways, Hal G. Sours, that he anticipated a decline of ten percent—or about $2,800,000 in automobile license revenues in 1943.

Director Sours also made public figures showing that a drop of about 36.8 percent—or $15,981,288 in gasoline tax income is anticipated in 1943.

The Indiana State Highway Commission has made 17 specific recommendations for bolstering the emergency road program. The report scores a tendency to meet obligations of the state government out of automotive revenues and suggested that all revenues from the highways be used to finance emergency construction and vital maintenance. It also urged the allocations to towns and cities from highway income be changed from flat sums of money to a basis of percentages.

Also recommended was that the federal government drop its tax of a cent and a half on the gallon and its $5 use tax on motor vehicles, enabling the state to bolster their own revenues without adding to the burden of motorists.



Place first Douglas Dam scroll case

Ten months ago TVA's Douglas Dam was started (ENR, Feb. 5, p. 213), and in what is said to be the fastest construction job in TVA history, workers recently placed the first scroll cage for the dam's power house.

Next spring, water from behind Douglas' masonry barrier is expected to roar through the scroll case to turn turbines and produce additional electric power for war industries in the surrounding countryside.

WPB estimates November construction was nearly 2½ times that of a year ago

Production agency's new measuring medium based on value of construction put in place, rather than contracts awarded.

The War Production Board's new index of war construction is expected to register a value of about 240 for November. The October figure was 256, and a year ago it was about 100.

Worked out by WPB statisticians the index uses November, 1941—just before the war—as a base, considered as 100, and measures the value of construction *put in place* during the month, plus deliveries of industrial machinery and equipment. Most available construction statistics, such as those compiled by *ENR*, measure *contracts awarded* in a given period rather than work done.

The index figures, starting in January, 1942, and running through the estimated November value, are: 114, 112, 139, 175, 192, 222, 261, 278, 272, 256 and 240. They reveal that construction activity followed a quite different course after the start of the war than did munitions production. Immediately after Pearl Harbor, production rose rapidly and steadily until September, flattened off in October, and rose again in November.

Construction put in place, on the other hand, showed no immediate rise as a result of the outbreak of war, partly because of the season but mostly because the first effect was the placement of a huge volume of contracts. As a result of this later development, *ENR's Construction Volume Index*, which measures contracts awarded, rose from 95 in December, to 176 in January, and 222 in February, etc.

By March, the effect of these contract awards began to show itself in work done and the WPB index began to rise very rapidly. Contract awards which caused *ENR*'s index to rise to 360 in May, started to fall off after that, but volume of work done continued to rise until August, when it, too, began a drop which is still continuing. Incidentally, however, the *ENR* index which was 185 in October rose 9 percent in November, to 202.

As of Oct. 31, the last date for which dollar figures are available, a construction and plant expansion program of $29,362,000,000 had been scheduled since June of 1940, according to WPB figures. This was made up of $7,148,000 of industrial equipment and machinery, $6,403,000,000 of industrial construction, $12,828,000,000 of military construction, $1,798,000,000 of public housing and works, and $1,183,000,000 of private housing.

Of this program $17,751,000,000 had been completed at the end of October made up of $4,445,000,000 of industrial construction, $8,451,000,000 of the military, $824,000,000 of war public works and housing, $794,000,000 of the private housing. There is a back log of nearly twelve billion dollars that was scheduled and is still to be completed.

• • •

Continental Divide Tunnel ordered halted by WPB

Work on the Continental Divide Tunnel—a major element in the Bureau of Reclamation's Colorado-Big Thompson power and irrigation project—was ordered halted last week by the War Production Board. This move was taken as a part of WPB's program of cutting down the volume of construction work next year. Early last month, WPB called a halt to a large number of reclamation projects, including the tunnel, but late in the month it agreed to reconsider its decision on the tunnel and several smaller projects (*ENR*, Nov. 26, p.11). Now it has reiterated its demand that the tunnel work stop; only the Green Mountain dam and reservoir portion of the project may continue.

As to the other projects which were brought up for reconsideration: Work by Japanese evacuees at Minidoka, Klamath, and Shoshone projects may continue; 140 units of Boulder City housing, scheduled for completion Jan. 15 may continue, but the remaining 71 units must stop; only irrigation for development of guayule rubber may continue at the Gila project; on the Altus project, only work to provide domestic water for the city of Altus and nearby camps may continue.

• • •

WPA to close down work in 16 states Feb. 1

Work Projects Administration operations will be closed out in 16 states and the District of Columbia by Feb. 1, in accordance with a recent Presidential order terminating the existence of the organization (*ENR*, Dec. 10, p. 809).

States where WPA project operations will cease by February are: Arizona, Connecticut, Delaware, Idaho, Maine, Maryland, Nevada, New Hampshire, North Dakota, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington and Wyoming.

Shop fire interrupts Green Mountain Dam work

Defective wiring or a faulty heating system was blamed for a recent half million dollar fire that leveled the machine shops of the construction company working on Green Mountain Dam, near Kremmling, Colo.

The blaze broke out in buildings of the Warner Construction Co., and raged for eight hours before several hundred workmen brought it under control. Tanks of anti-freeze fluid and oils stored in the shop turned the fire into such an inferno that ordinary fire-fighting equipment was almost useless.

Machinery, equipment and materials valued at from $300,000 to $500,000 was destroyed.

S. O. Harper, chief engineer of the Denver Reclamation Bureau Office, later expressed the hope that work would be resumed soon on the project. Most of the equipment damaged or destroyed was "dead", Mr. Harper said, since its use on the project was ended. The construction company had completed its work on the dam and was working on the powerhouse at the time. Mr. Harper said he expected that substitute equipment for the powerhouse work would be available soon.

• • •

U. S. and Brazil at work on major health program

Brazilian and United States tropical medical specialists are organizing what is said to be the greatest health and sanitation program yet undertaken for the vast Amazon valley, with the object of protecting thousands of additional workers expected to enter the valley to expand production of rubber and other tropical materials.

As announced by the Office of the Coordinator of Inter-American Affairs, the United States and Brazil will spend about $7,000,000 in the improvement of the valley's health and sanitation conditions.

Already planned are six hospitals of 50 beds each, four strategic centers in the valley at Braganca, Breves, Santarem, Port Velho, Rio Branco and Teffe. Breves is located on the island of Marajo, at the mouth of the Amazon, while Porto Velho is nearly 2,000 miles upstream, showing the distances involved.

Besides health centers, the program calls for establishment of 50 to 100 clinics to treat the sick, and to give advice in disease prevention and dietary methods. In Belem, sanitation engineers are working on a malaria control plan that involves structures to prevent tidewater from entering the city limits and to provide drainage of surface water.

Road maintenance problems dominate meeting of state highway officials

American Association of State Highway Officials devotes major part of its annual meeting to discussion of means for maintaining roads in condition to carry war-generated traffic safely

Brady Gentry, new A.A.S.H.O. president

How to meet current restrictions on the use of construction materials and equipment and still maintain highways in condition to carry the heavy traffic generated by the nation's expanding war activity, was the chief topic of discussion at the 28th annual meeting of the American Association of State Highway Officials held in St. Louis Dec. 7-9.

Various aspects of this problem were discussed in talks by George H. Davis, chairman, Missouri State Highway Commission; G. Donald Kennedy, president of the association; Maj. Gen. Philip B. Fleming, head of the Federal Works Agency; Thomas H. MacDonald, head of the Public Roads Administration; M. J. Hoffmann, commissioner, Minnesota Highway Department; and Col. F. B. Horner, chief, highway division, Transportation Corps, representing Gen. C. P. Gross, Chief of Transportation. Services of Supply, U. S. Army.

"Our principal assignment for today, and for the duration," said Mr. Kennedy, "is to provide and conserve essential transportation. If we fail—if we grow discouraged, if we shrug off the responsibility—war transportation cannot do the job that must be done. And we may well fear that if we fail in vision and energy today, tomorrow the job will no longer be in the hands of the state highway departments."

The discouragement of state highway departments, Mr. Kennedy said, is not hard to understand. New federal agencies have issued a mass of frequently changing regulations and restrictions, some of them completely unsound. These have been formulated by policy-making officials and working staffs lacking in knowledge of available scientific data on highway matters.

Turning to the work of the association, Mr. Kennedy said that in hearings before the Board of Investigation and Research, in numerous appearances before Congressional committees, in work on the War Department's Highway Traffic Advisory Committee, in meetings with officials of the OPA, the ODT, and the WPB, the association's officers have endeavored, with some success, to halt arbitrary and unwise retrenchment and to mobilize support for action on measures to permit highways better to serve essential transportation.

Mr. Kennedy urged the highway departments not to let their preoccupation with maintenance problems keep them from making definite plans for the postwar period when everyone expects that highway building will be used to bridge the gap between the war period and the peace-time economy. And in this planning he asked highway engineers to recognize that the problems of the urban areas now constitute one of their primary obligations.

Post-war planning

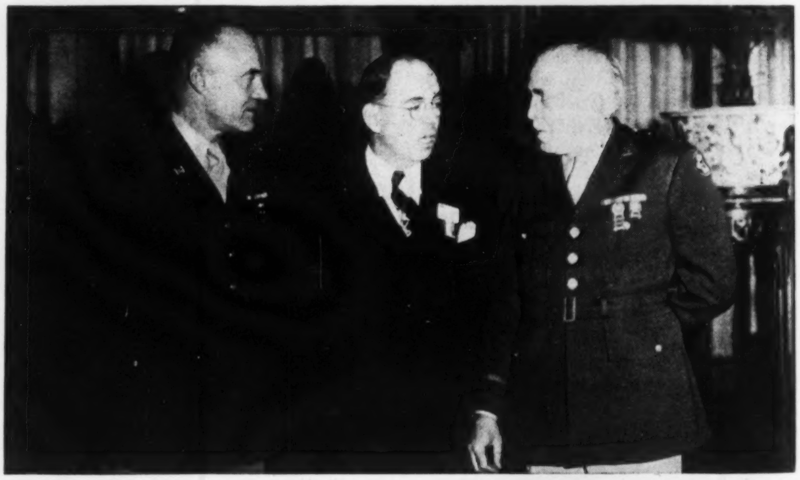
The desirability of planning now for the post-war period also was stressed by General Fleming. Observing that the Defense Highway Act of 1941 for the first time enabled the Commissioner of Public Roads to advance funds to local authorities to acquire right-of-way for projects authorized by that act and that the act also authorized the Federal Works Administrator to acquire such lands by use of the federal government's power of eminent domain, conveying the lands to the state highway departments, he urged the departments to plan broadly for the needs of the post-war period, especially for the service of urban areas, on the assumption that like powers will be given to state and federal agencies when the time comes to inaugurate post-war construction.

Paying high tribute to Commissioner MacDonald for the way in which he had guided the relations between the federal and state governments on highway matters, General Fleming said that as head of the Federal Works Agency he has no purpose to alter in any way the relationship between the state highway departments and the Public Roads Administration or the existing channels of that relationship through the field organization of the Public Roads Administration.

Road replacement

Commissioner MacDonald said that the chief cause of the present difficulty experienced by state highway departments in getting materials and equipment to maintain their roads is a fundamentally unsound premise to the effect that the annual program of construction that has been carried on for many years past consists only of building new roads.

The fact is that the program has been almost exclusively one of replacement and reconstruction. Needed replacements to correct inadequacies in the highway system have always lagged and it has



Missouri State Highway Department photo

Col. John A. Wheeler, engineer officer in charge of the Alaska highway work, who spoke to the convention on that project, G. Donald Kennedy, head of the Michigan State Highway Department and president of the A.A.S.H.O., and Maj. Gen. Philip B. Fleming, of the Federal Works Agency, chat during convention session.

been necessary by constant maintenance to extract the maximum of utility from existing mileage prior to replacement. In view of the virtual cessation of replacements, and in consideration of other restrictions and limitations, it is already apparent that the state highway departments are going to have great difficulty in meeting the load placed on their highways by the mounting industrial activity attendant on the war effort.

Practically all current highway transportation is war transportation, Mr. MacDonald said, and virtually all main roads are necessary to the war effort. The elimination of non-essential passenger car operations is almost an accomplished fact, but elimination of this traffic has been more than offset by increased demands imposed on truck transportation and by the increase in average loads carried by trucks.

The overwhelming evidence, Mr. MacDonald said, indicates but one solution, which is more expedient than sound. It is not economical but it is mandatory. It consists of extraordinary maintenance, both more extensive and more intensive. It will require not only the absolute retention of all existing personnel, equipment and material facilities of the state highway departments, but also the pooling and efficient cooperative use of those facilities by the minor highway administrative agencies. In addition to the retention of maintenance equipment by the departments, it will be necessary for them to have access to essential repair parts and to be authorized to make replacements of such essential equipment as can no longer be kept in operation, and to speed up the procedure for obtaining them.

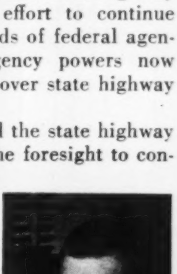
T. H. MacDonald

The state highway departments also will require a considerable volume of repair and patching materials and quantities of the less critical materials such as bitumens. For their part, it is imperative that they set up and maintain inventories of current and prospective material requirements in order that these may be given joint consideration with other war material needs.

Storm signals seen

Five storm signals ahead were cited by M. J. Hoffmann, head of the Minnesota Highway Department: (1) Ill considered group efforts within the states to reduce motor-vehicle license fees and gas-tax rates on the ground that, with construction rigidly limited for the duration, highway revenues will exceed immediate needs; (2) movements to suspend, in whole or in part, state license fees for motorists who lay up their cars for definite periods of time; (3) attempts at further diversion of highway funds or cancellation of federal-aid authorization; (4) post-war effort to discard or disrupt long-proven principles of federal highway assistance; and (5) effort to continue indefinitely in the hands of federal agencies expansive emergency powers now temporarily exercised over state highway affairs.

Mr. Hoffmann urged the state highway departments to have the foresight to continue to collect motor vehicle fees and gasoline taxes at existing rates so that they can build up reserves for use in the post-war period in catching up on the replacements that cannot be made during the war. He recommended that these funds be invested in government bonds. Further, he asked the states to cooperate as far as possible with the federal government in its effort to advance the war effort by



M. J. Hoffmann

(*Continued on p.* 56)

Highway officials raise state dues

In order to give the American Association of State Highway Officials funds with which to develop more active representation in Washington, its constitution was amended at the St. Louis meeting to increase the dues paid by most of the states. Under the formula used heretofore, the 1943 dues would amount to $19,180; under the formula adopted at the meeting, the amount will be raised to $27,630.

Under the new set-up, the dues of 15 states whose income for highway purposes is less than $15,000,000 will not be increased, remaining at $250 or $350; the dues from six of the states having somewhat higher income will be increased from $350 to $450, those for twelve states will be increased from $450 to $600, dues for seven other states will be increased from $450 to $750, and those for the seven in the group having the largest annual income will be raised from $450 to $1,000.

Little opposition to the proposed increase in dues was expressed on the floor of the convention. A few of the representatives went on record as not being able to commit their departments to the increase, but generally voted for the change; in one instance it was proposed that the association use part of its reserve of $66,000 to inaugurate the expanded program, coming back to the state highway departments next year with a request for an increase in funds sufficient to meet the added cost.

Through the adoption of a group of resolutions, the association put itself on record with respect to numerous problems now facing the state highway departments. It asked the Office of Defense Transportation to exempt state highway departments from ODT General Order No. 1 relating to the control of motor vehicles in so far as that order affects motor equipment used in highway maintenance operations. Congress was asked to give early consideration to legislation authorizing appropriations for federal-aid highways, secondary roads and grade crosisng eliminations for the fiscal year 1944 and 1945, the funds to be spent as soon as conditions will permit. It also was requested to enact legislation to extend the availability of all federal-aid funds until at least one year following the close of the war, and to authorize expenditure of unobligated federal-aid funds for surveys and advance planning of highway work and for the acquisition of right-of-way needed for such improvements. Another request to Congress was to continue the present plan of federal-aid allocation at existing rates, the association reaffirming its opposition to any change in the federal-aid system.

As revenues derived from taxes imposed on motor vehicles and fuels are the sole or chief source of support for state and local highway and city street construction and maintenance, the association went on record as urging the federal government to retire from the field of automotive taxation to permit the states to impose equivalent state taxes, if desired. It was recommended to the state highway departments that they take up this matter with their Congressmen.

The War Production Board was asked to modify rulings that have been issued under its General Limitation Order No. L-197, which prescribes the type and characteristics of portland cement that may be manufactured and sold during the emergency and prescribes methods for selection of agencies which may legally inspect that cement. Under current interpretations of the order, state highway departments may not use their testing facilities but are compelled to pay other agencies for cement testing work while their facilities remain unused. And while the testing laboratories of the state highway departments are precluded from inspecting and testing cement for their projects, the cement companies from whom they buy can designate the agency to make the tests.

(*Continued on p.* 56)

Maintenance needs dominate meeting

(Continued from p. 55)

the elimination of arbitrary restrictions on highway traffic. This, Mr. Hoffmann said, will help to keep state control over their highways from being taken from them permanently.

Looking to the future, Mr. Hoffmann expressed skepticism as to the advisability of laying down elaborate plans for superhighway construction in the immediate postwar period. He said that the main problem of the highway departments at that time will be rehabilitation of the roads they already have, which work should take precedence over more visionary schemes.

Maintenance needed

Need for a large amount of work in keeping our highways in condition to carry the war load was stressed by Gen. C. P. Gross who said that we cannot permit the highway system to fall into such bad repair that the movement of essential war traffic will be impeded or that wear on vehicles and tires will be unnecessarily severe. It should be clear that there can be no acceptance of the belief that because we have a highway system, nothing needs to be done to keep it. Those who saw the disintegration of our highways under traffic of the last war know that such a belief is false, especially false today.

Markham honored

W. C. Markham, executive secretary of the association, who announced his desire to retire at the last annual meeting as soon as a successor could be found, was elected executive secretary emeritus by unanimous vote of the meeting and was presented with a gold watch with the association's octagonal insignia engraved on the back. In presenting the watch, Fred R. White, state highway engineer of Iowa, reviewed Mr. Markham's long service with the association, giving him a large share of the credit for obtaining the passage of the federal-aid acts on which the present system of federal-state participation in highway work is based.

W. C. Markham

Hoffmann gets award

The George S. Bartlett memorial award, presented jointly by the American Association of State Highway Officials, the American Road Builders Association and the Highway Research Board for an outstanding contribution to highway progress, was presented to Paul G. Hoffmann, president of the Studebaker Corp., for his work as chairman of the board of the Automotive Safety Foundation. In presenting the award, Frank T. Sheets, president, Portland Cement Association, said that the Automotive Safety Foundation is dedicating a large part of its energy to development of a sound postwar highway program.

Also honored at the meeting was J. S. Williamson, chief highway commissioner of South Carolina, past president of the association, to whom the association's testimonial for service was presented by F. E. Everett, state highway commissioner of New Hampshire.

Alcan Highway

At the "family dinner" Tuesday evening, presided over by Carl W. Brown, chief engineer of the Missouri Highway Department, Col. John A. Wheeler, engineer officer in charge of the Alcan Highway, spoke briefly of that great undertaking, paying high tribute to the pioneer spirit and ruggedness of the young men who bore the brunt of the work. He was followed by Thomas H. MacDonald, who showed color photographs of the highway work.

New officers

Brady Gentry, chairman of the Texas Highway Commission, was elected president of the association, and T. C. Frame, chief engineer of the Pennsylvania Highway Department, was elected first vice president. Regional vice presidents were elected as follows: District 1, H. A. MacDonald, Massachusetts; District 2, J. A. Anderson, Virginia; District 3, S. C. Hadden, Indiana; District 4, Robert A. Allan, Nevada. G. H. Henderson, Rhode Island, was reelected treasurer and C. H. Purcell, California, and R. H. Baldock, Oregon, were elected to the executive committee.

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Surveys started for Ohio civil airport

Surveys have been started as a preliminary to grading of a 190-acre plot north of Columbus, O., which will be site of a $300,000 civilian airport to be constructed by the Ohio Institute of Aeronautics.

Donald L. McDevitt, president of the institute, said that plans call for erection of a main hangar, a repair and storage hangarm, a dormitory, restaurant and an administration building. The new port is expected to provide facilities for flight instruction, repairs of planes, and motor and instrument maintenance.

Highway Association raises state levy

(Continued from p. 55)

The War Production Board was asked to expedite the procurement of materials and supplies for bridge construction by whatever means will insure obtaining materials for essential projects.

Because of the increased load being put on the maintenance operations of the highway department by the postponement of replacement work and by the increase in truck movements, the association urged that the government classify employees engaged in maintenance as being engaged in an essential industry.

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Postwar surveys urged

State highway departments were urged to make surveys and prepare road and bridge plans for such post-war work, retaining such of their staff as is not needed for war activities for this planning so that the projects can be put under way promptly following the termination of war. The departments also were requested to take up with their state legislatures the matter of confirming the appointment of state representatives on the highway Traffic Advisory Committee, representatives that had been named at the request of the federal government.

Oppose heavy axle loads

The executive committee of the association again went on record as opposing axle loads in excess of 18,000 lb., regardless of the character of the load to be moved. The executive committee was asked by the committees on material, research, construction and maintenance to take up with the Office of Price Administration the matter of granting a departure from its Order No. 61 relating to the use of bituminous products for pavement construction and maintenance to permit the users to require softer grades such as a 200-300 penetration asphaltic base stock in the manufacture of the MC or RC cut-backs and asphaltic emulsion to be used in plant-mix for stockpiling and in seal-coat construction and maintenance. These committees were of the unanimous opinion that the efforts of the OPA to reduce the number of paving grades is desirable in the present emergency, but they were of the opinion that the 60-70 penetration grade is a better all around product for bituminous pavement mixtures than the 50-60 grade included in the OPA order and should be substituted for that grade.

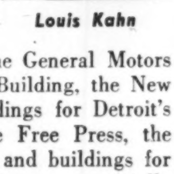
A voluminous report by a committee set up some time ago to study the matter of social security and unemployment compensation for state highway employees was submitted to the convention to be printed and distributed to the state highway departments.

Kahn group to continue despite founder's death

The death of Albert Kahn Dec. 8, 1942, recorded in these pages last week, although a severe loss to the organization that he headed, will cause no crisis in its affairs, largely because of Mr. Kahn's own foresight. As long as 20 years ago, his associates relate, he began to give key men in his organization a place at the conference table, and began to train them to carry on after he was gone. This policy culminated about two years ago, when the incorporation of the firm was changed and it assumed the name of Albert Kahn Associated Architects and Engineers, with twenty-five key men as stockholders. Then in 1942 Albert Kahn and Louis Kahn, his brother and long-time associate in the firm, signed a foreword in a book in which these key men were presented as the nucleus of the organization, which said in part: "This partnership will assure the permanency of the organization which will carry on even after the retirement of the present administrators." Louis Kahn is now the executive head of the organization.

Albert Kahn

Born in Germany March 21, 1869, Albert Kahn came to America at the age of 11 and got his first job as an errand boy in an architect's office. By dint of study, hard work and self-help, he built a reputation and then an organization that has had a profound and beneficial effect on industrial architecture. Most recent examples of his work include the Chrysler tank arsenal, Ford bomber plant and aeronautical plants for Wright, Glenn L. Martin, Curtiss-Wright and Pratt & Whitney. For the Navy his firm has designed bases at Midway, Honolulu, Alaska, Puerto Rico, and in Jacksonville. Many naval bases and army installations of the first World War were also products of his office. Outside of the industrial field there are other examples of his work, particularly in the Detroit area, where the General Motors Building, the Fisher Building, the New Center Building, buildings for Detroit's three newspapers, the Free Press, the News and the Times, and buildings for the University of Michigan are especially notable for the architectural character of their design.


Louis Kahn

JOBS OF THE WEEK

ROAD, Ohio

State Highway Department, Columbus, grading, draining, concrete paving, bridges on 5.181 miles Lorain and Medina Counties to A. J. Baltes, Inc., Norwalk, O., $555,847.

HOUSING, California

Housing Authority of City and San Francisco County, San Francisco, awarded contract five hundred dormitory units to Barrett & Hilp, San Francisco. Estimated cost $500,000. Lewis P. Hobart, San Francisco, is architect. Also 500 dwelling units to MacDonald & Kahn, Inc., San Francisco. Estimated cost $1,000,000.

HOUSING, Near Washington, D. C.

Alley Dwelling Authority, Washington, D. C., three hundred fifteen units to Standard Homes, Inc., New York, N. Y. Estimated cost $1,500,000; three hundred thirty-three demountable housing units, to Victor R. Beauchamp, Washington, D. C. $1,368,000; and 238 demountable houses to the Arlington Fabrication Co., Arlington, Va., $1,939,125.

HOUSING, Washington

King County Housing Authority, Seattle, general contract 1,300 housing units to Moore & Roberts, Seattle, $2,499,777. E. W. Morrison & Associates, Seattle, architects.

HOUSING, Michigan

Public Housing Authority, National Housing Administration, Detroit, awarded contract 1,900 unit housing project in Wayne County to Hunkin-Conkey Co., Cleveland, O. Estimated cost $9,500,000.

PLANT, Kentucky

Defense Plant Corp., Washington, D. C., awarded contract synthetic rubber plant, to engineering staff of B. F. Goodrich Co., Akron, O. Construction awarded to Batson & Cook, West Point, Ga.; Prack & Prack, and Chester Engineers, Pittsburgh, Pa., are engineers. Blaw Knox, Pittsburgh, Pa., process engineer. Estimated cost $4,000,000.

PLANT, Texas

Industrial company awarded contract additional facilities for chemical and by-products plant to Foster-Wheeler Corp., New York. Estimated cost $2,500,000. H. Lloyd, Houston, architect. Defense Plant Corp. will finance.

AIR FORCE IMPROVEMENTS, Fla.

U. S. Engineers, Jacksonville, awarded contract clearing, grubbing, grading, drainage, paving runways, to Middle West Roads Co., Indianapolis, Ind. To exceed $1,000,000.

AIR FORCE IMPROVEMENTS, Del.

U. S. Engineers, Philadelphia, Pa., awarded contract paving runways, taxiways, hardstands, to George & Lynch, Wilmington. To exceed $1,000,000.

SEWER, Kansas

U. S. Engineers, Kansas City, Mo., storm sewer ordnance plant, to L. G. Barcus, Kansas City, Mo., and Kramme & Jenson, Des Moines, Ia. Estimated cost $500,000. W. S. Lozier, Kansas City, Mo., architect. Broderick & Gordon, Kansas City, Mo., management contractors.

SEWER, Louisiana

Shipyard awarded contract sewer line for plant to American Heating & Plumbing Co., New Orleans, L.a, under $1,000,000.

INSTALLING FLOOD GATES, Texas

U. S. Engineers, Galveston, installing flood gates, main project Colorado River, at intersection of river and Intracoastal Waterway, Matagorda County, to Brown & Root, Inc., Houston. Estimated cost $1,000,000.

BUILDINGS, Oregon

U. S. Engineers, Portland, Ore., contract for buildings at Replacement training center, Deschutes County to Smith, Wright & Hoffman, Portland, Ore. Estimated cost $4,000,000.

BUILDING, Nevada

U. S. Engineer, Sacramento, awarded contract group of hospital buildings, in Nye Co. to Haddock Construction Co., Pasadena, Calif., to exceed $1,000,000.

WATER SUPPLY, Kentucky

George Kehl & Son, Chicago, Ill., has been awarded contract storage reservoir, Hardin County by U. S. Engineers, Louisville. Less than $1,000,000.

NOTE—Additional bidding and contract news on over 800 projects large and small appear in the Construction News section beginning on page 143.

OBITUARY

William B. Hunter, 72, who retired three years ago after serving for 33 years as civil engineer for the City of New York board of water supply, died Dec. 8 at Lincoln, Mass. Mr. Hunter was an engineer for the board of water supply from 1906 until his retirement in 1939. For the four years before his retirement he was engaged in the construction of part of the new Delaware aqueduct and had previously been in charge of the Catskill aqueduct of the Shandaken tunnel of the Schoharie development.

Adolph Lodewijk de Leeuw, 81, internationally known consulting engineer, died at his home in Plainfield, N. J., Dec. 5. Born in the Netherlands, Mr. de Leeuw came to the United States in 1890, and became associated with the Pennsylvania Railroad in the engineering department. After association as chief engineer with numerous manufacturing companies, he opened his own office in New York City as a consulting engineer, specializing in plant management and production.

Charles Christian Dornbush, 67, consulting engineer of Pittsburgh, Pa., died Dec. 2. He had been for 40 years an engineer with the Jones & Laughlin Steel Corp., and had served also as an engineer for Dravo shipyards.

Claude I. Grimm, for many years head engineer of the U. S. Engineer department, North Pacific Division at Portland, Ore., died Dec. 1.

M. F. Capron, 86, for several years a draftsman and engineer for the Champion Iron Co., of Kenton, Ohio, died Dec. 3.

Fred H. Richt, 65, designing engineer in the Cuyahoga Falls, Ohio, city engineering department, died recently in Cleveland.

John W. Harris, 73, former construction superintendent for the Jones & Laughlin Steel Co. at Pittsburgh, Pa., died at East Liverpool, Ohio, Dec. 7.

Ira W. Sylvester, 75, a city engineer connected with the city engineer's office at Alexandria, La., for many years, died there recently.

E. A. Lawrence, 62, president of Jennings-Lawrence Co., civil engineers and surveyors, of Columbus, Ohio, died Dec. 4 at Columbus.

Fitzhugh G. Lee, 74, Etowah county, Ala., surveyor, died Dec. 8 at Gadsden, Ala.

John W. Woermann, 74, civil engineer and former principal senior engineer of the war department's Chicago district of rivers and harbors, died Dec. 8. He had held the post of principal senior engineer in the U. S. Engineers, War Department, for 17 years until his retirement in 1939.

George E. Payne, 74, civil engineer of Thibodaux, La., died Dec. 5.

Camilo Castellion, civil engineer of Nicaragua, died Dec. 7 at Jinolega.

Loren S. Alger, 93, street engineer of Tacoma, Wash., died there Dec. 8.

Thomas M. Medford, 72, architect of the District of Columbia, died Dec. 11 in Washington, D. C. Mr. Medford served with the municipal architect's office, the Navy Bureau of Yards and Docks, and the War Department as architect and engineer, returning to private practice in 1935.

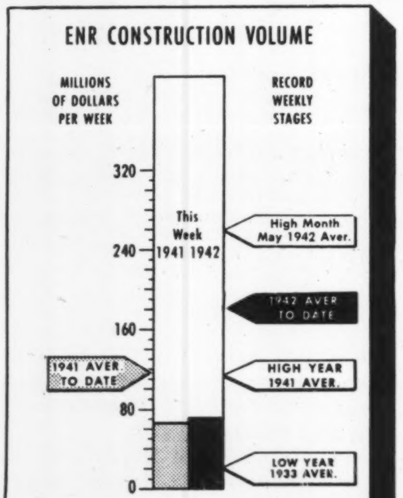
Ira H. Boston, 58, treasurer of the Barclay White Co., builders, of Philadelphia, died at Philadelphia Dec. 8.

Eric Edwin Hall, architect for Cook county, Ill., who designed more than 250 buildings in Chicago and the county, died Dec. 8.

CONTRACTS AND CAPITAL

ENGINEERING CONSTRUCTION volume for the week totals $75,539,000, an increase of 13 percent over the corresponding 1941 week, but 11 percent below the volume for a week ago. The 60 percent gain in federal work offset an 85 percent drop in state and municipal construction to boost public volume 19 percent over the 1941 week. Private work, however, is 50 percent below last year. Comparisons with the preceding week reveal a decrease of 12½ percent in federal, and a 12 percent decline in the public total. State and municipal and private work, on the other hand, are 12 and 1 percent higher, respectively, than a week ago.

The current week's total brings 1942 construction to $9,196,157,000, an increase of 58 percent over the $5,818,529,000 reported for the 51-week period in 1941. Private construction, $552,325,000, is 53 percent below the period last year, but public work, $8,643,832,000, is 86 percent higher as a result of the 135 percent climb in federal.



In the classified construction groups, gains over last week are in sewerage, public buildings, earthwork and drainage, and streets and roads. Gains over the week last year are in waterworks, public buildings, and unclassified construction.

New capital for construction purposes for the week totals $2,452,000, a decline of 52 percent from last year. The week's new financing is made up of $1,500,000 in corporate security issues, and $952,000 in state and municipal bond sales.

New construction financing for the year to date, $10,214,049,000, tops the $6,324,725,000 reported for the 51-week period a year ago by 62 percent.

CONTRACTS

(Thousands of dollars)

	Week Ending		
	Dec. 18 1941	Dec. 10 1942	Dec. 17 1942
Federal	$43,497	$79,823	$69,786
State & Municipal	17,311	2,387	2,668
Total public..	$60,808	$82,210	$72,454
Total private..	6,158	3,058	3,085
TOTALS	$66,966	$85,268	$75,539

Cumulative
1942.......(51 weeks)......$9,196,157
1941.......(51 weeks)......$5,818,529

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative	
	1941 51 weeks	1942 51 weeks
NON-FEDERAL ...	$1,373,607	$634,863
Corp. Securities..	357,909	182,729
State & Mun....	432,957	211,979
U.S.H.A. loans...	30,399	....
R.E.A. loans.....	100,500	....
R.F.C. loans.....	288,842	157,455
Fed. Aid—Highways	163,000	82,700
FEDERAL	4,951,118	9,579,186
TOTAL CAPITAL.	$6,324,725	$10,214,049

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost...	Dec. '42..	283.69	136.37
Building Cost	Dec. '42..	226.63	122.51
Volume	Nov. '42..	462	202

FHA MORTGAGES

	Week Ending		
	Dec. 13 1941	Dec. 5 1942	Dec. 12 1942
Selected for appraisal			
Title II....	$16,757	$3,671	$3,878*
Title VI...	$3,510	$6,649	$5,744*

* Subject to revision.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Single Story Concrete Factories

Sir: In your article "Single Story Concrete Factory—a War Inspired Innovation" on p. 120 of your Oct. 22, 1942, issue, you state that "the heavily reinforced thin shell barrel arch and inverted beam design of a concrete roof construction was considered and found less desirable than the type adopted." We do not know of any building constructed in the U. S. of such defined type except Z-D roof construction as designed by our offices. We assume, therefore, than an inference is made to our type of design unless some other engineers have made studies of similar looking shapes without considering the use of the Z-D principle of spatial, supporting action.

Our company was not asked for any data for the building in question, nor would we have proposed the use of a Z-D construction — primarily conceived for large spans — for the small span of 20 ft. On the other hand, the type of structure described in your article would not be practical for larger spans. As the span increases, Z-D construction becomes more practical, not only as a roof, but the curved slab is also structurally better able than a flat slab to take up concentrated loads of whatever may be suspended from it.

The system of construction described for the plant in question is certainly an improvement in the construction of one-way slab panels. The system of form work and construction was, however, employed by us for many years for Z-D shell roofs in collaboration with a number of contractors. The innovations of construction plan and plant referred to are not innovations at all to buildings in general, and we refer to the article on p. 42 in *Construction Methods* of September, 1942, describing the construction of one of the recently built concrete barrel roofs — incidentally, by the same contractor who is building the plant referred to above. You may see from the arrangement of scaffolding, the hinges for the side forms on the wide beams projecting past the column face, arrangement of moving forms, etc., that the construction procedure is exactly the same. The use of house mover dollys instead of rails and wheels for rolling formwork has been applied to many a Z-D structure in the past.

One point which has not been brought out in your article, which, however, is the most essential as far as speed and economy of construction is concerned, is the innovation of the so-called "cyclic construction procedure" as it has, no doubt, been used by the contractor on the job under discussion and on many of recent war emergency structures of the Z-D type.

JOHN E. KALINKA
Vice-president
Roberts and Schaefer Co., Engineers
Chicago, Ill.

Removing Snow from Airports

Sir: I read with much interest your excellent article "Fighting Snow to Keep 'Em Flying" in the Nov. 5 issue. I have one objection to make in relation to the procedure outlined on p. 91, under the heading "Quick Helps on Snow Removal." I refer particularly to the first sentence, which I quote: "Get and keep your own snow removal equipment. If you depend on highway or municipal machines, chances are you won't have equipment when you need it." In normal times no valid objection could be made to such procedure. However, wartime scarcity of equipment fixes definite limits to plans for equipment expansion.

Permit me to suggest that, if every airfield in this country were to station the maximum amount of equipment necessary to clear its runways during heavy storms, there probably would not be enough equipment within the confines of the United States to do this work. This is particularly true with respect to the large rotary-type plows of which there is a limited number.

It would appear that the only way to secure the number of this type of equipment necessary would be to take the major portion, if not all, of the heavy rotary plows now used to clear highways. Much of this equipment would stand idle on many airfields through a large part of the season, and in other cases, where storms occur only in occasional years, it would not be needed at all during the snow season. As a result, many important highways might be blocked for long periods of time.

With the shortage of equipment that exists in the United States and the extreme necessity for the removal of snow not only from runways but also from the highway systems in this country, it would seem that the equipment should be pooled in some manner so as to gain the greatest possible advantage of the use of existing equipment. It would appear far better to place only a nominal amount of the lighter types of snow removal equipment at the individual airfields located in the snow country and to call upon the equipment and the trained crews of the highway departments in cases of emergency. The several state highway departments have the predominant amount of equipment now available for removing snow. Moreover, they have trained crews capable of obtaining the maximum results from the use of this equipment. The suggestion is made that the highway departments perform the work of snow removal from the runways in emergencies, particularly in the case of severe storms requiring a number of the lighter pieces of equipment, together with the heavy rotary plows. This work should be performed for the federal government by the state at cost. This plan would necessitate the location of enough snow removal equipment in close proximity to the landing fields so that the equipment could be moved and put into action immediately when the emergency arose.

It is obvious that in general the snow should be removed from the runways before it is removed from highways because it is absolutely necessary for the airplane to land before the available fuel is consumed. By concentrating both the local field equipment and the highway equipment on runways, they can be cleared quickly and the same equipment can then be used to open the highways. In this way both the airways and the highways can function. Both are vitally needed to carry on the total war effort of this country.

R. H. BALDOCK
Chief Engineer
Oregon State Highway Commission
Salem, Oregon

EDITORIALS

VOLUME 129 NUMBER 25

December 17, 1942

Construction Can't Relax

As a year of construction that broke every record on the books comes to a close, the construction industry is forced to ponder statements from Washington that "drastic" cuts in construction volume are coming in 1943. Yet the worst that government statisticians have been able to predict is about a 35 percent reduction, which will still leave engineering-construction in 1943 above any prewar year—for example, 8 percent above 1941 and nearly 60 percent above 1929. Moreover, such figures apply only to work in the continental United States. In addition, from Australia to Africa, from the Equator to the North Pole, both Navy and Army will be building bases and airfields, camps and transportation facilities, using American construction men, American materials and American machines. To domestic construction volume must be added construction activity around the world, and the aggregate may readily bulk as large as this year's record domestic volume of over twelve billion dollars. War still has big demands to make of the construction industry, its managers, manufacturers and manpower. Despite the tremendous activity of the past two years, there can be no relaxation of effort in 1943.

Landfill Disposal Prospects

Municipal administrators, as well as army officials, will watch with keen interest the application of landfill refuse disposal methods at training camps, which is discussed in this issue. Unquestionably the success of the army operations has important implications for postwar extension of landfill disposal in municipal practice. Many cities under 20,000 population (as well as some of greater size) have long been plagued with problems of refuse disposal. They have been forced either to use unsanitary, nuisance-provoking dumps, or to adopt incineration. And because the latter is quite expensive, uncontrolled dumping with its attendant evils has been most prevalent. Landfill disposal, on the other hand, is low in cost, eliminates nuisances and may be employed to reclaim low-lying and otherwise valueless lands. This has been proved in several places, most notably San Francisco and Fresno, Calif., Seattle, Wash., Portland, Ore., Lincoln, Neb. and New York City. When men now in the service return to civilian life to recount their experiences with landfill disposal methods in the army, this list of cities is sure to expand.

Local Materials Merit Consideration

As wood for construction has become steadily scarcer and as transportation for any type of building material has become more difficult to arrange, there has been a natural tendency to turn to local materials for a particular job. Typical of these local materials is structural tile, and the first major use of this product for cantonment construction is described in this issue. Although the cost was 6 percent more than equivalent wood construction, it is believed that this differential can be reduced on future work. Also to offset the cost, the camp was built in two-thirds the time that was estimated for wood. Tile is only one of many "local" materials, all of which deserve consideration in the emergency. Some will merit use, and some may even demonstrate advantages that will assure them a new place in normal construction.

The American Way

When waterworks utilities were directed by the War Production Board recently to share their "surplus" inventories of supplies, the first thought of many managers was that they were being penalized for foresight in having purchased additional material to tide them over the emergency. However, since much of the material had been bought before shortages existed, and some of it had been quickly put to use for extensions created solely by war demands, it was soon realized that the WPB order was not in any sense an anti-hoarding measure. It simply mirrored the necessity for utilizing all available materials. The response from waterworks men was quick and complete. In this issue, for example, the Hartford (Conn.) Metropolitan Water District lists and offers for sale "surplus stock" of pipes, fittings and valves. Other cities are circulating memoranda locally and listing with their state water coordinators a catalog of "surplus" materials that they have available. In this way, individual inventories are being reduced and vital water supply materials are being shared. The prompt and unselfish response of waterworks men in this regard clearly demonstrates that they offer more than lip service to the American way of doing things.

The End of WPA

In accordance with the prevalent practice of making new words from the initials by which governmental agencies are known, the WPA, on the occasion of its recent demise, might well be labeled Waste Passes Away. For it was waste—waste of money, waste of effort, waste of abilities and waste of time—that characterized the Work Projects Administration throughout its too-long existence.

If one chooses to ignore this basic fact, it is possible to mete out a fair measure of praise for WPA by reciting the number of bridges it built, the miles of road it constructed and repaired, and the buildings it erected. And likewise it is possible to increase its stature by pointing to the exceptionally capable and honest performances of many of its administrators and engineers, as for example Perry Fellows as chief engineer and national administrator, and Brehon B. Somervell as local administrator in New York City. But if WPA is to be weighed on its worth to our national economy, waste cannot be ignored. Waste epitomized WPA.

Why WPA was wasteful is easy to deduce, at least by backsight. By combining a dole and public works construction, it succeeded only in increasing the cost of both. By attempting to maintain a man's self-respect by giving him a job involving neither incentive nor responsibility, it only fostered a spirit of loafing and a game of getting something for nothing that wasted manpower and lowered rather than raised self-respect. By concentrating in the hands of a centralized body with unlimited funds power over a great army of men in adversity, it invited political abuses, with attendant waste of money. Finally, by using the construction function merely as a device through which funds could be distributed to the needy, it degraded engineering and the art of construction to the point of destroying its manpower and abilities. WPA made a travesty of the inspiring definition of the engineer and construction man as an individual who can do well with one dollar what any bungler can do with two, after a fashion.

In appraising WPA as a device for relieving unemployment it should not be forgotten that it often was not approved by persons it theoretically benefited most; local governmental officials, for example, were among its most severe critics, even though they sometimes hesitated to go on record as being opposed to the windfalls of cash. Nor should it be forgotten that force account construction, which was WPA's method, has only rarely proved efficient and economical, and then only when the administering officials have exceptional ability; using force-account on a nationwide basis in dozens of states and thousands of towns not only invited but assured waste. And most important, it should not be forgotten that WPA contained no kernel of permanent cure for unemployment. It just turned a sickness into a chronic disease.

On its record WPA was not a success. It deserves to be remembered only to avoid its repetition.

Unfinished Business

Since Pearl Harbor, postwar planning has been on the shelf. Without question, that is where it belonged, for until we could be sure that we were going to win the war and thus have control of our own destiny, postwar planning was without purpose and a drain on energies that were needed for war. Now, however, it is proper to consider whether a change in this attitude is not justified. Our functioning war industry and strengthened home defenses, as well as our demonstrated ability to carry the war to the enemy in the Pacific and in Africa, are all favorable factors. And, although the war is far from over, if it is under control we can afford to begin to plan for the future.

A small but important element of postwar planning involves public works construction. Before Pearl Harbor, some states and cities had done some planning, and the National Resources Planning Board had worked out a plan for federal aid in the financing of surveys and designs, but Congress turned down the enabling legislation. Several weeks ago Congressman Alfred F. Beiter introduced another bill that eliminates most of the objections voiced against his earlier measure. The bill, although it will die with this session of Congress, deserves careful consideration because it will no doubt form the basis for new legislation next year. And then there is the question of local postwar public works planning and legislation, as distinct from federal aid; in view of the improved financial condition of cities, much can be done in this field.

Postwar planning is unfinished business. Necessarily postponed, it must soon be reinstated on the active list.

ENGINEERING NEWS-RECORD WALDO G. BOWMAN, *Editor*

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In a 60-day period 112 structural tile buildings were completed at a Midwest army post to house the WAACS.

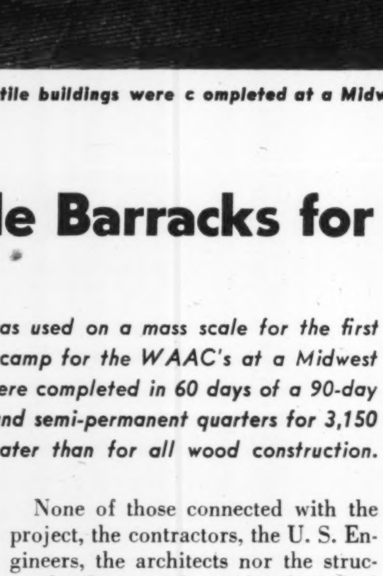
Structural Tile Barracks for the WAACS

***Contents in Brief**—Structural tile was used on a mass scale for the first time in cantonment construction on a camp for the WAAC's at a Midwest army post. A total of 112 buildings were completed in 60 days of a 90-day contract period, providing attractive and semi-permanent quarters for 3,150 women at a cost only 6 percent greater than for all wood construction.*

STRUCTURAL brick and tile were used for construction of a semi-permanent barracks-type building for housing the new Women's Army Auxiliary Corps in Iowa. The project, built in 60 days, will house 3,150 persons and consists of 112 buildings: 63 barracks, 10 mess halls, 21 storage and company administration buildings, 9 classroom buildings, 2 recreation halls, 4 general administration buildings, an infirmary, a general headquarters building and a chapel. Eighty-four of the buildings are two-stories high.

The bids offered for tile construction with wood roof and interior framing were compared with known costs for all-wood construction. This showed the tile construction to be only 6 percent higher in first cost for the permanent and low maintenance expense tile walls. As structural tile was readily available in the immediate area and would eliminate rail haul and use of scarce lumber its use was authorized. No previous experience existed on which to base the time requirement for clay block construction, therefore, the time specified was determined by the need.

None of those connected with the project, the contractors, the U. S. Engineers, the architects nor the structural tile manufacturers, had had previous experience with this type and volume of construction. Yet, the chronology of the job shows that bids were taken July 25, field work started August 5, and on October 3 all buildings were occupied though the chapel was not quite complete. Thus, under a competitive bid contract, the project was completed 30 days ahead of what was thought to be a "tight" 90-day schedule. The first 17 buildings were completed in 30 days.



Hard-burned 4x5x12-in. and 8x5x12-in. tile with a 1-in. air space form the walls of the barracks.

The structures built follow the general details of wood buildings for the same uses, except that the exterior walls are structural tile and brick. The roofs are frame with slate-covered asphalt shingles, and in the two-story buildings the second floor is of wood construction. The barracks and classroom buildings are 30 ft. 10 in. wide and about 90 ft. long.

Exterior walls are smooth, red-mingle shades of vitrified blocks of the hard-burned, de-aired type readily available throughout the Middle West. Walls are 13 in. thick, using one 4x5x12-in. unit and one 8x5x12-in. piece with a 1-in. air space between. The units make a 5½-in. high course. A special jamb 5 in. high and 10 in. long was used to close the ends of the tile at the corners and around the windows. This unit gave the appearance of tile and gave a much neater job than if standard brick had been used. A square chimney on each building is built of brick, from the ground up, around a circular flue.

The tile are bonded at every fourth course by putting the 8-in. wide unit on the outside, thus tying the three courses of 4-in. wide units to the full width of the wall. Lintels, over doors and window openings, are structural tile filled with concrete and have two ½-in. round rods laid through the tile and extending about a foot beyond the opening on either side. These units were precast and set in place as construction proceeded.

Seven firms supply tile

The structural clay products for the job—2,000,000 blocks and 700,000 brick—were supplied by seven firms from plants within a 30-mile radius of the work. While some stocks were on hand when the work started the more than 2,700,000 pieces were not available and most of them had to be made during the period of construction. It is said that some of the blocks were still hot from the burning when delivered to the site, in fact were still warm when placed in the structure.

The first serious obstacle to rapid construction of the camp was a minimum 90-day delivery time for the pipe and fittings for utility lines. This was overcome through cooperation of municipal water departments, within a 400 mile radius, who loaned pipe from their emergency stocks on the promise that it would be replaced as soon as that purchased under the contract priority was obtained.

Concrete block foundations

The buildings are supported on continuous footings carried to about 4 ft. below the finished grade line as this area is in the —20 deg. zone. Trenching machines were used to excavate a 2-ft. wide cut along the trench line and to within 12 in. of the plan elevation of the bottom of the footing. The bottom 12 in. of the excavation was made by hand and then filled with concrete without forming. Above the poured concrete, a wall of 12-in. wide concrete blocks was placed to the finished grade line.

The area inside the foundation walls was filled with earth to 8 in. below the finished grade line followed by 4 in. of sand, waterproofed paper and 4 in. of poured concrete. This concrete was covered with fabric waterproofing and a finished concrete floor placed above it except in the barracks area of the building where wooden sleepers were laid on top of the waterproofing, followed by a finished floor of hard wood.

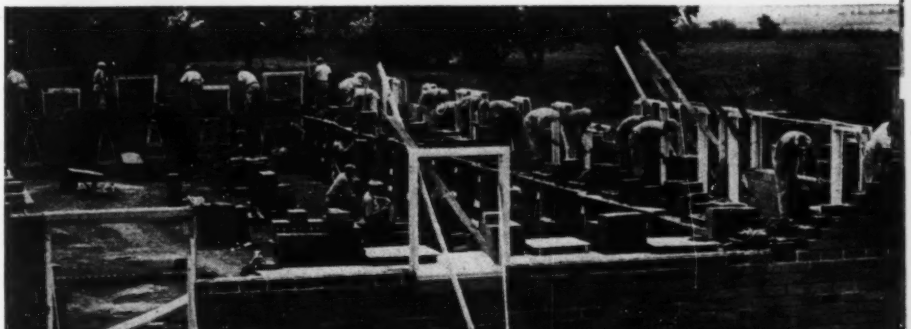
The suppliers of the structural tile assisted the contractor considerably by taking off the quantities of material required for individual buildings and hauling the pieces directly from their plant, unloading the exact amount required at favorable positions around the structure so that no material had to be re-handled. The suppliers kept special representatives on the job who ordered this material as required for the progress scheduled by the project manager and yet avoided having the material on hand ahead of time so that it interfered with foundation construction or utility lines. The contractor gives considerable credit for the speed and efficiency on the work to this assistance in always keeping material available and in this way saving a great deal of manpower and time.

Wall construction was done from the inside of the buildings. Wheelbarrows were used to deliver the tile around the perimeter of the structure. As the wall rose in height, one level of scaffold on horses was set on the floor inside the building and used to complete the tile work to the ceiling of the first floor. Wood trim, including window and door frames, was assembled elsewhere and delivered to the job by trucks ready to set in position as the bricklaying reached the proper level.

For most of the buildings the next operation was setting timber 6x6-in. columns, founded on shallow spread footings, on the one-third point of the width of the structure and capping them with 8x8-in. pieces, spliced continuous through the length of the building, to support the second floor. On this, 2x12-in. floor joists were laid followed by a subflooring of 1x6-in. lumber laid diagonally, a layer of builder's paper and a finished floor of 1x3-in. maple. The finished floor, however, was not laid until the building was inclosed.

The blicklayers used the rough second floor as a scaffold to complete the wall to the eaves. Structural tile for the walls above the first floor was hauled up ramps, made of timber and in sections so they could be picked up and carried from one building to an-

About 2,700,000 pieces of brick and tile went into the 112 buildings with very little machinery used for material handling. Mortar and tile were wheeled up the portable ramp (below) with the assistance of an extra man.



Progressive construction by specialist crews speeds the cantonment buildings. Scaffolding is used only for the gable ends.

other as construction progressed. The loaded wheelbarrow was brought to the bottom of the ramp where a man hooked a rod into the front of the barrow and helped to "double-head" the load up the slope. The tile for the gable end of the buildings was placed from scaffolds erected on the outside.

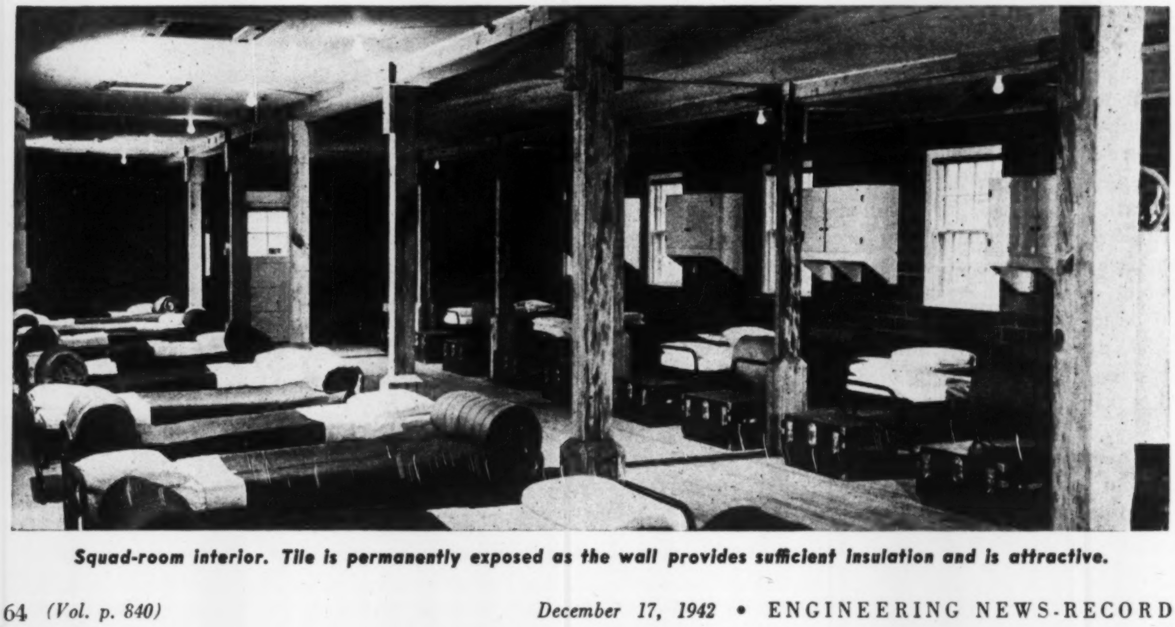
Most of the roofs were built entirely in place, framing being done by carpenters working on scaffolds laid on ceiling joists above the second floor. For mess hall and recreation buildings, where interior columns were not used, the fabricated timber truss spans the entire width of the building and was assembled on the ground at a central shop and hauled to the buildings, then set by crawler crane. The framing was covered with 1x6-in. sheathing and then with slate-covered asphalt shingles.

The interior of the barracks is not finished other than wallboard used for the ceiling on the second floor and the surface presented by the smooth, impervious, hard-burned wall tile (Fig. 5). Small cabinets are provided for each of the occupants of the barracks and mirrors are placed over individual washstands, the only concessions to feminine occupation.

The rush schedule made it necessary to work 24 hours, three shifts, daily on the excavation, foundations and utilities until the first 17 buildings were completed. During this time the force was increased to 3,000 after which it was reduced to two shifts, and finally to one, as the techniques of tile construction was mastered. Bricklaying was done on two shifts, using only the daylight hours.

Tile structures cost somewhat more than all wood, but the extra cost is more than offset by the permanent character of the material and its low maintenance cost. The 13-in. thick tile wall, with plenty of dead air space, makes heating much easier than with 6-in. thick frame construction. In addition, structural tile is generally readily available as the entire brick and tile industry is working at only 30 percent of capacity and no critical materials are involved in its manufacture.

Architects and engineers were Keffer & Jones, Wetherell and Harrison, for whom Chas. W. DeJarnette was in direct charge at the site. Contractors who made this outstanding record in rapid construction were Woodcrest Construction Co. and Rosoff Bros. Inc., under William Goldsmith, project manager.



Squad-room interior. Tile is permanently exposed as the wall provides sufficient insulation and is attractive.

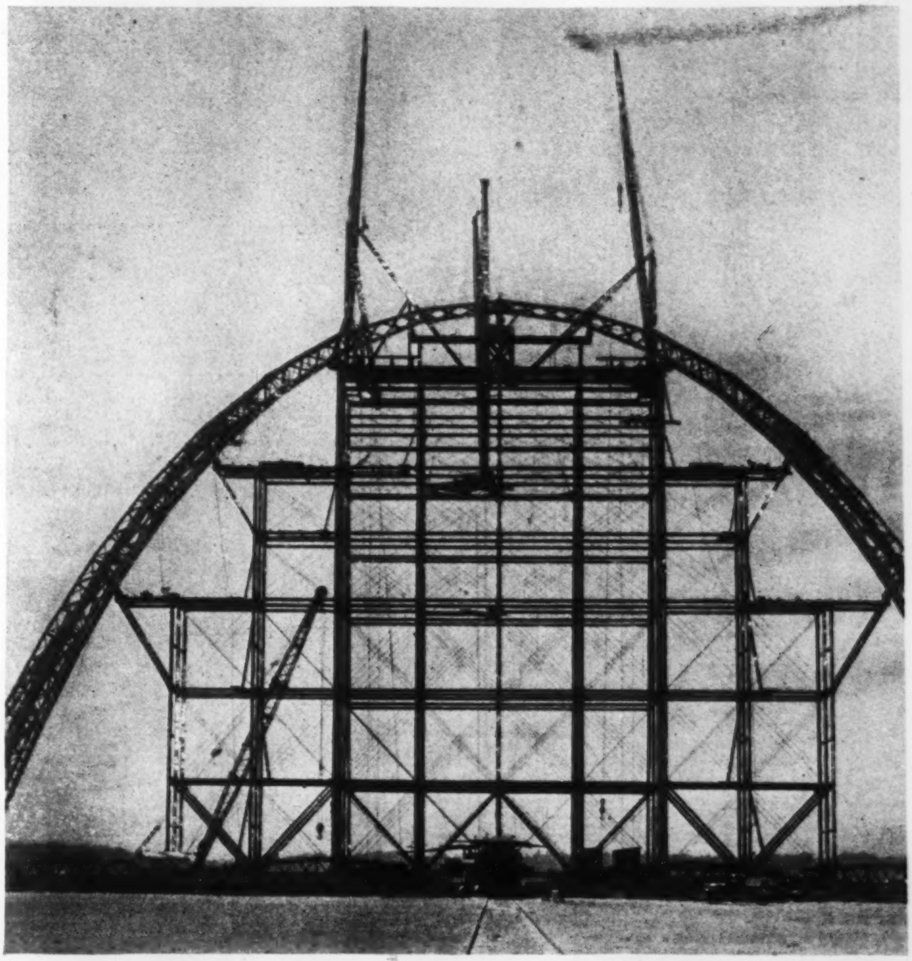
Blimp Hangars Built by Contrasting Methods

***Contents in Brief** — Duplicate blimp hangars for the Navy, framed with a large number of 328-ft. span steel arch trusses, were erected by two different procedures. In one, a single large tower served as both falsework and derrick support, while in the other derrick towers and falsework towers were separate. Sequence of door and hangar arch erection was also different on the two jobs.*

In the Navy's large program of airship hangar construction, being carried out to house and service our growing fleet of coastal patrol blimps, two contractors have used quite different procedures to erect identical steel-framed hangars. Unfortunately, both jobs were hampered by delays in materials and frequent turn-over in labor forces so that comparison of the erection methods, either on a speed or efficiency basis, is impossible. On the other hand, since both jobs were completed to the entire satisfaction of the Navy, it is interesting and instructive to consider them in contrast to one another. Both involved originality, and the structures themselves were spectacular and out of the ordinary. Hangar A was erected by the Harris Structural Steel Co. of New York, and Hangar B by the American Bridge Co. of Pittsburgh.

The problem presented to each contractor was to erect a steel arch hangar of considerable length equipped with orange peel doors at each end, the design being quite similar to that first used for the Goodyear airship dock at Akron, Ohio (*ENR* April 4, 1929, p. 583). The span was to be 328 ft. and the rise 185 ft. to the centerline of the arches.

As designed, the hangars have a framework of two-hinged arch truss ribs resting on pinned shoes tied to-



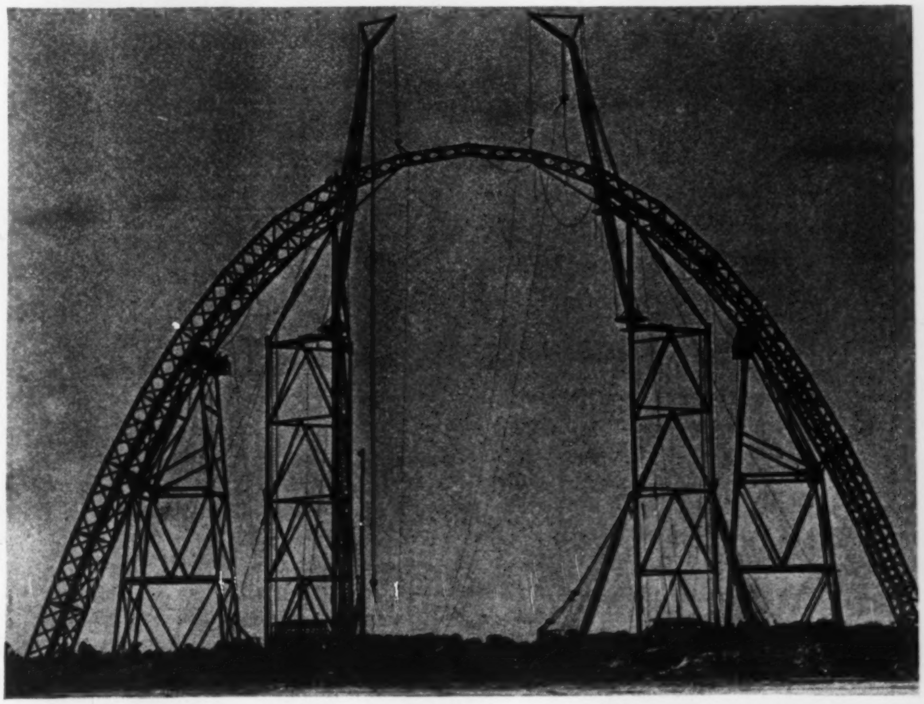


Fig. 1. Two different methods of blimp hangar erection. Hangar A (top) utilized a large jumbo traveler that served as falsework as well as support for the derricks. On Hangar B (bottom), tower-mounted derrick travelers were supplemented by separate movable falsework towers.

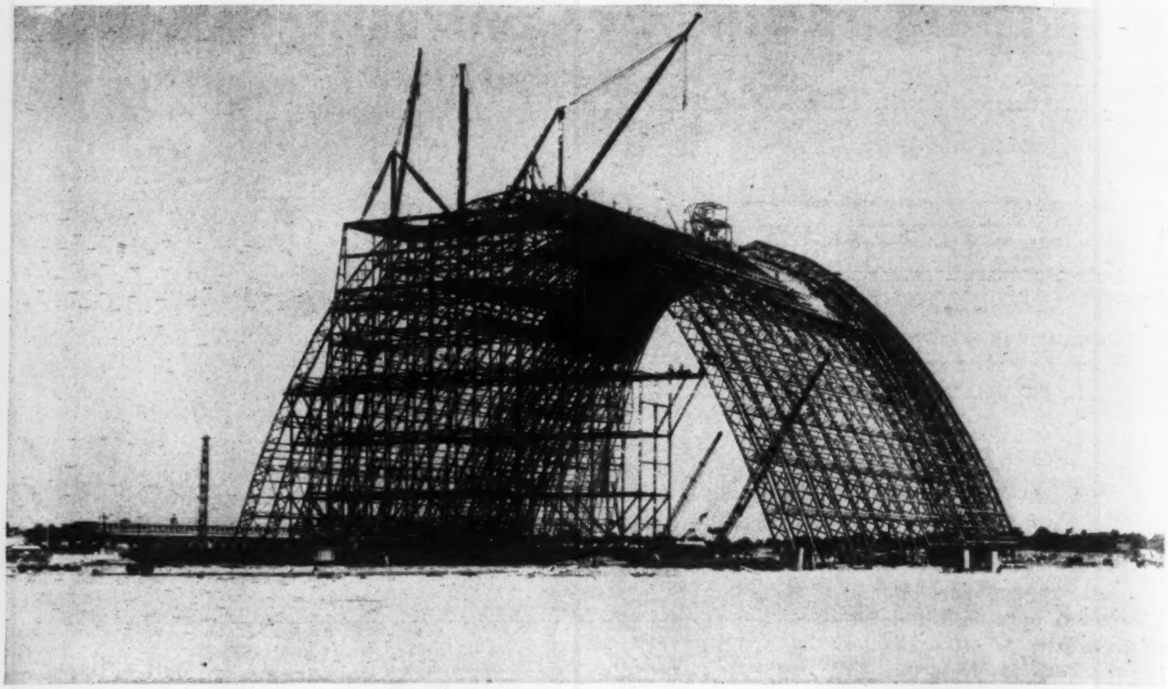


Fig. 2. One of the hangars begins to take shape. This is Hangar A on which the single jumbo traveler was used. Roofing operations shown involve installation of timber subdeck over crown of hangar to take snow loads; none is required on steeper slopes of roof.

gether across the hangar by 1⅝-in. diam. rods beneath the floor. The arches are of all-welded construction (Fig. 4) except for the field splices which are made by rivets. Each arch is 8 ft. deep and is divided into 20 panels (10 each side of the crown).

Type of framing used

There are a total of 27 arch ribs in each hangar, and some knowledge of their disposition and makeup is necessary to an understanding of the erection methods. Arches 2 and 26 carry the door pin assemblies at their crowns and are consequently made wider than the others, the chords consisting of U-shaped assemblies of plates, and there being two web systems, one attached to each stem of the U. All other ribs have T-section chords, and web members are also T's. In a typical arch the chords are halves of 12- and 15-in. beams, weighing up to 95-lb. per ft.

Arches 1 and 27 are the "gable" or end arches, and each supports the upper ends of four oblique ribs, two at either side of the crown at panel points 7 and 8. These oblique ribs extend out into the door area, their purpose being to carry the wall covering that serves as a transition between the straight walls of the hangar and the curved walls of the doors. Because they support these oblique ribs the gable arches are the heaviest in the hangar, their chords running up to 18-in. 130-lb. T-sections equipped with cover plates.

The differences in the methods adopted by the two contractors to solve this steel hangar erection problem resulted from two fundamental decisions, one involving sequence of operations, the other the type of erection equipment to be used. Thus, Harris decided to erect an orange peel door at one end first and then continue straight on through the hangar, while American Bridge chose to complete the hangar first and then go back to the doors. American Bridge erection equipment consisted of stiff-leg derricks carried on top of two slender triangular towers that moved along tracks, laid about 90 ft. in from either side of the hangar, while Harris mounted its stifflegs on a single track-mounted tower or jumbo frame that completely filled the inside of the hangar. American Bridge used supplemental towers for supporting the hangar arches while they were being assembled, but the Harris jumbo incorporated the arch erection supports in its own framework, Fig. 1.

Contrasts in methods between the two jobs began with the assembly of the erection equipment. The Harris jumbo, 200 ft. wide, 86 ft. long, and 175 ft. high, consisted of about 500 tons of steel H-section columns and struts arranged in 25-ft. square panels, X-braced with steel rods. The jumbo frame was erected by a guy derrick, jumped progressively upward on the frame itself, just as in conventional building procedure.

Erecting the jumbo traveler

Initial assembly operations were carried out by a crawler crane, which set the seven parallel lines of standard railroad trucks upon which the jumbo moved, erected the first tier of framework and lifted the guy derrick into place on it. The guy derrick, carrying on from there, alternately erected two tiers of framing and pulled itself up until it was at a level one tier below the top. From this location it topped out the jumbo and set a 25-ton stiffleg at each forward corner. Its job done, the guy derrick, with boom pulled up and lashed to the mast, was left in position so that it would be available to dismantle the stiffleg and the jumbo after the hangar was completed.

Seemingly simpler, but on the

whole more tricky and difficult, was the method used by American Bridge to assemble its two stiffleg tower travelers. These structures were triangular in plan, about 31 ft. on a side, were 120 ft. high and were entirely erected by a 60-ton locomotive crane on the ground. To reach this unusual height the crane was equipped with a 130-ft. boom, extended with a 30-ft. gooseneck jib. The principal difficulty occurred in setting the mast of the 50-ton stiffleg derricks on top of the traveler towers. Even with its long reach there was only about a 2-ft. drift between the sheaves and the necessary point of pickup of the mast. After the stifflegs were in place on top of the towers, they erected the movable falsework towers required for arch rib support.

How Hangar A was erected

Harris, as stated, erected one of the doors before proceeding with the balance of the hangar. To support the door steel, however, it was necessary to have the first three arches and the oblique ribs in place, and erection of this framing constituted the initial operation.

Arch 1, the gable arch, was set first, and, being the heaviest arch in the hangar, it provided a good initial test of the centering and erection equipment. The derricks, as stated, were of 25-ton capacity. One had a 90-ft. boom and a 10-ft. jib, the other a 100-ft. boom and a 10-ft. jib. Rib sections came to the job in two-panel lengths and were erected in these lengths except for the first lift which was made into a 4-panel section by splicing on the ground. This 4-panel section was raised by a crawler crane while the other erection pieces of each arch were lifted by the jumbo stifflegs.

Four points of support for each 10-panel half arch were provided by the jumbo, at panel points 4, 6, 8 and 9; the top support had been planned initially for panel point 10 under the crown of the arch but it was moved back to panel point 9 after hangar erection began so as to be out of the way of the crown-splicing operations. Each point of support was provided with a 50-ton screw jack so that the arch could be adjusted for closure operations, but after the first rib was erected and the number of shims required at each point of support determined, it was seldom necessary to use other than the jacks at panel points 9. It had been expected that the springs on the railroad car trucks upon which the jumbo was mounted would deflect under each arch load and rebound when the arch was swung free. The springs did deflect slightly but, due to their friction and rigidity, they did

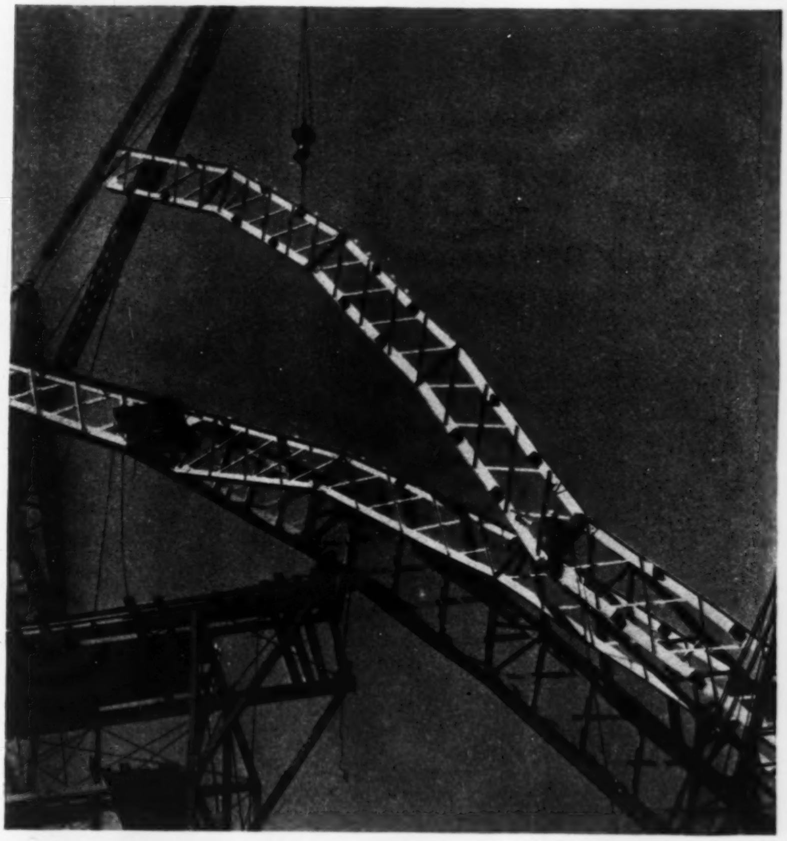


Fig. 3. Installing top section of one of the oblique ribs that frame into Arch 1, the gable arch. This is Hangar A, and lifting derrick is on the erection jumbo.

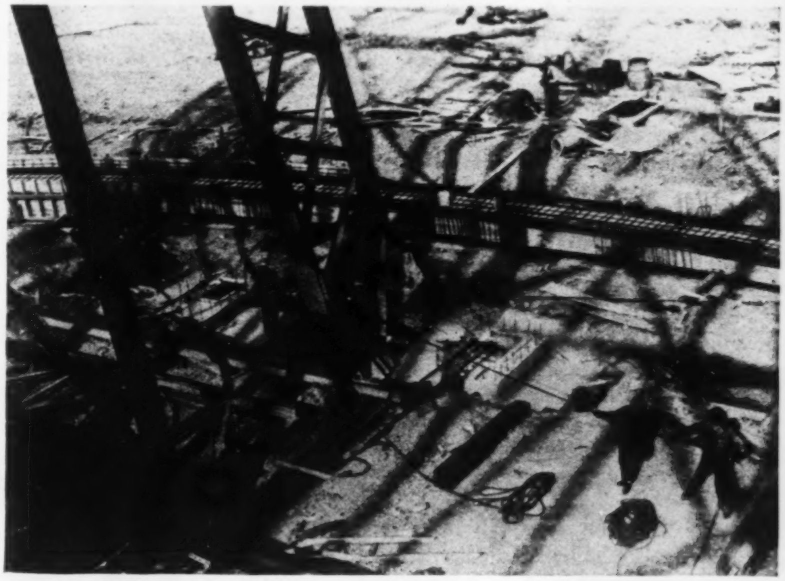


Fig. 4. Setting the bottom section of one of the all-welded ribs. Note that tie rods are in place in floor trenches, ready to be pinned to the shoe. Falsework traveler at left. This is Hangar B.

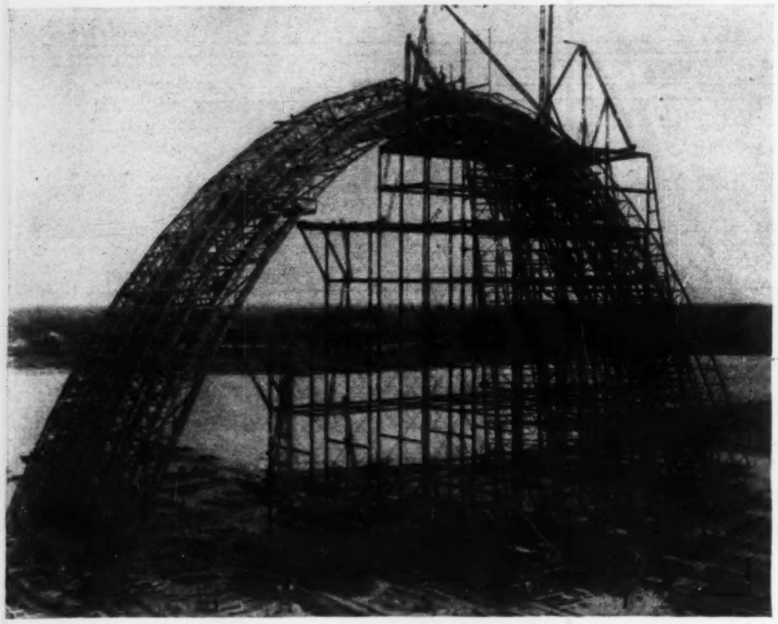


Fig. 5. Erecting the orange peel doors on Hangar A, using the oblique ribs that frame into Arch 1 as falsework. Front segments of door are about complete in this view, ready to be rolled forward to make way for the next segments which will be assembled in the same position.

not rebound. Therefore once the points of arch support on the jumbo were shimmed to proper elevation, they stayed at this elevation throughout the job, provided the tracks were maintained level. Great care was exercised to keep the tracks level, and the jumbo was braced and cabled to them at each setting to keep it from moving.

Closure of the arches was effected by setting the last arch sections a little high at panel points 9 and then lowering the jacks at these points until the cantilever ends at the crown came into position for splicing. Since the tie rods across the base of the arch had been adjusted to predetermined lengths before erection started, the arch was complete and stable once the crown splice was made.

As soon as the gable arch was closed the stifflegs reached over it to set the two oblique ribs on either side, being aided by crawler cranes on the ground, Fig. 3.

Moving the jumbo traveler

The jumbo was then ready to move backward one bay into position to erect Arch 2, but in doing this it had to remain connected with Arch 1 to give it stability. A part of the permanent bracing between adjacent arches was a steel girder strut along the crown, and some means was sought to make this serve as the connection between Arch 1 and the jumbo during the moving operation. The connection was effected by suspending a 12 x 12 in. timber encased in steel hanger plates directly below the bottom flange of the strut and fastening it to the top of the jumbo. The hangar plates were equipped with holes 6 in. apart, and bolts in these holes passed through 12 in. long slots in the legs of angles attached to the bottom flange of the strut. By means of this slotted connection the jumbo could be moved 6 in. at a time and remain connected to Arch 1 all the while. Additional stability throughout this move was provided for Arch 1 by installing a temporary outrigger or horizontal king-post truss against its front face.

With the entire steelwork thus secured, two crawler cranes attached to the jumbo through two-part $\frac{5}{8}$-in. cables moved it to the next arch position in about 30 minutes. Arch 2 was erected next and then, repeating the operation of backing away while retaining connection to the erected steelwork through the pinned strut, the jumbo reached Arch 3. Following erection of Arch 3, the big pin assembly for the doors was lifted into place on the top of Arch 2. Weighing 18 tons this was the heaviest erection piece in the hangar.

With three arches in place, erection of the orange peel doors could be started, Fig. 5. Each of the two leaves of a door was one-eighth of a sphere with its apex supported on the pin-assembly at the crown of Arch 2 and

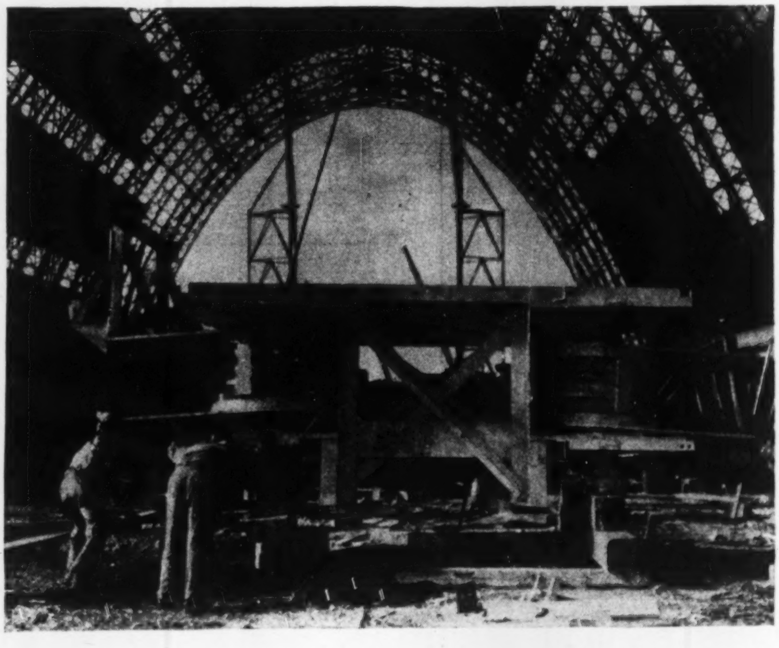


Fig. 6. Heaviest erection pieces in the blimp hangars were the 18-ton door pin assemblies, one of which is here shown starting upward to its prepared seat on top of Arch 2 of Hangar B.

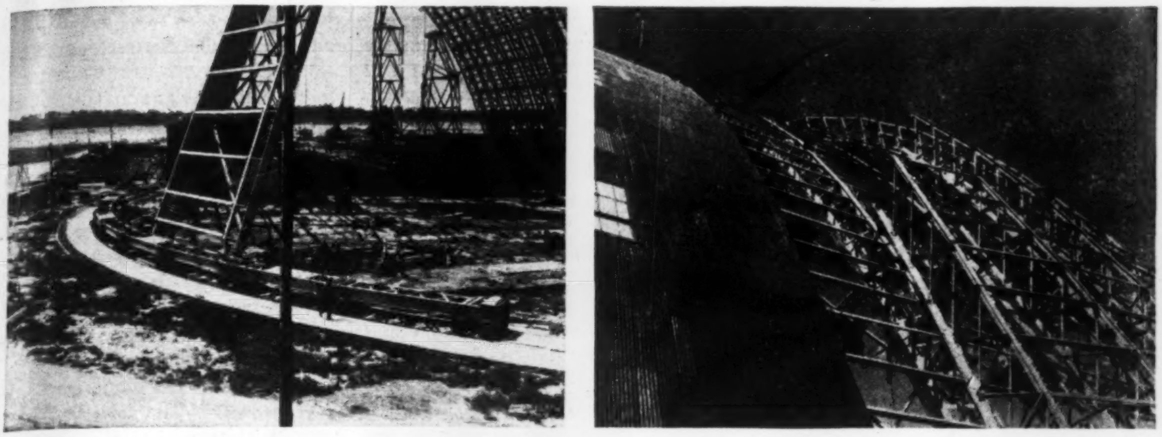


Fig. 7. Door erection on Hangar B. Line of door trucks (left), was run back until front end was just beyond the oblique ribs in the center foreground. Then front half of door was assembled (right), leaning against temporary horizontal outrigger trusses attached to hangar framing.

its base carried on railroad trucks operating on a semi-circular track on the ground. Framing consisted of nine ribs, five main ones extending full height and four intermediate ones that were stopped off at about two-thirds height. The ribs were connected by a half dozen tiers of circumferential struts, supplemented by diagonal bracing.

Door erection procedure

For erection purposes each door leaf was divided into four segments from front to rear, the first segment consisting of three ribs (two main and one intermediate rib) while each of the remaining segments contained an intermediate and a main rib. Each segment furthermore was divided into five parts vertically, requiring field splices at four levels. In order to erect the doors, hangar framing was used as falsework. This was accomplished by bolting horizontal timbers to the outside of the two oblique ribs at the several elevations where door rib splices occurred. These timbers were set out far enough to hold the door ribs in their true erected positions. Another piece of erection apparatus consisted of four parts of $\frac{5}{8}$-in. cable running from the crown of the arches to a deadman in front of the hangar, to resist the 20-ton thrust that the erected doors exert. This cable was removed after about half the hangar framework was in place.

Door erection procedure was to place the front segment first, roll it ahead, erect door segment 2 and so on until the leaf was complete. About two-thirds of the height of the doors was erected by crawler cranes on the ground while the top pieces were lifted by the jumbo stifflegs. Both door leaves were erected simultaneously so as to keep the load against the hangar balanced.

The remainder of the hangar was erected at the rate of about three ribs a week (maximum, one rib a day), with the jumbo backing steadily toward the opposite end where door erection procedure was repeated, completing the job.

How Hangar B was erected

In mapping a plan of procedure for Hangar B, American Bridge, as stated, chose to erect the hangar proper first and then follow with the doors. The type and disposition of the equipment for this operation is shown in the bottom illustration of Fig. 1.

On each side of the hangar there was a movable falsework tower 42 ft. wide and one hangar bay long, so located and of such height that it could give the half arches two points of support. Just inside of the falsework tower but two bays ahead of it was the derrick tower on top of which the stiffleg with 105-ft. boom and 20-ft. jib was mounted. These pieces of equipment, operating on three lines of railroad track (the center track being common to both) kept these relative positions on each move, and at each position erected two arches and the fill-in framing between.

Erection began with the falsework towers located in the bay between Arches 1 and 2, which were erected together. The first lift of each half arch was a three-panel section. Set by the tower derricks, it was pinned to the shoe at the bottom while its top rested against a 35-ton screw jack mounted on brackets on the falsework tower. The next lift, also 3 panels long, was then erected and cantilevered one panel beyond a support at panel point 5, consisting of a 100-ton screw jack mounted on top of the 110-ft. falsework tower. This cantilever was then extended two more panels by the next erection lift, and the arch was up to panel point 8. Both Arch 1 and Arch 2 were brought to this level before closure operations for either were undertaken.

The closure operation, involving the placing of a two-panel section either side of the arch crown, was effected by the tower derricks working together. Each lifted its section into place, with the lower ends inserted but not connected in the splices at panel points 8. While thus held by the derricks, the crown splice was made. Then as the jacks on top of the falsework tower at panel point 5 were lowered, the connections at panel point 8 were bolted and finally riveted, thus completing the arch. Closure of Arch 2 followed, using the same procedure, after which the falsework towers and derricks were each moved two bays to position 2 where the procedure was repeated for Arches 3 and 4. Moving on then to successive positions, the derricks, always staying two bays ahead of the falsework towers, erected the balance of the hangar. Best progress was made during a period of prompt arrival of shipments of steel when four arches a week were completed for two consecutive weeks.

Heaviest erection pieces, in addition to the 18-ton pin assembly, (Fig. 6), were the first lifts of the arches—17½ tons for Arches 1, 2, 26 and 27, and 9½ tons for the others. All these lifts were made by the tower derricks, and since under the heavy loads the slender towers would have been unstable, special counterweights were required. These were, therefore, supplied in the form of timber boxes filled with dirt suspended at 20-ft. radius from a Chicago boom mounted at the base of the back leg of each tower. The normal weight of these counterweights was 20 tons, but for the heavy lifts of the end arches the weight was increased to 30 tons by hanging pieces of arch steel on the sides of the boxes. These counterweights allowed the booms to reach out 90 ft. to the side and 50 ft. in front. A small 5-ton counterweight hung from the side leg of each derrick tower gave some additional safety on extreme reaches.

With the hangar arches complete there remained the oblique ribs and the doors at either end to be erected. The tower derrick, before leaving position 2, had assembled a 30-ton stiffleg with 110-ft. boom and 30 ft. jib on top of the hangar just back of Arch 2, and this piece of equipment was used to erect the doors at this end as well as the oblique hangar ribs that are connected to Arch 1. At the opposite end the doors and the oblique ribs were erected by the tower derricks after they had completed the hangar.

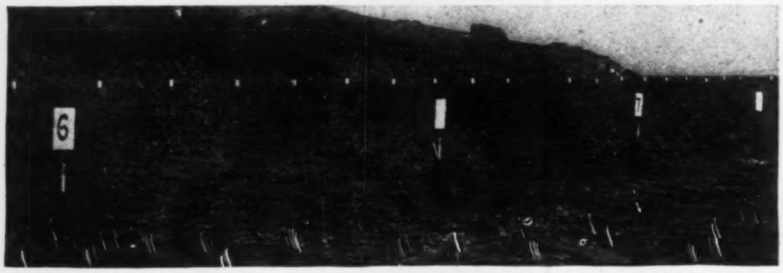
For door erection the hangar arches were utilized as falsework against which the door ribs could be leaned while they were being assembled, Fig. 7. Temporary horizontal outrigger trusses placed at the elevations of the three sets of field splices in the door ribs and extending from Arch 1 to Arch 3 supplied the actual support. The front half of the door, consisting of three main and two intermediate ribs, was assembled first and then rolled forward on its trucks into its open position while the rear half was built. The first lift to about midheight, was placed by crawler cranes on the ground, and then the stiffleg on top of the hangar at one end or the tower derricks at the other completed the job. The two door leaves at either end were always carried up simultaneously to keep the loads against the hangar balanced.

The hangars were designed and their construction was supervised by the Bureau of Yards and Docks, U. S. Navy, Rear Admiral Ben Moreell (CEC) U. S. N. Chief of the bureau. Lt. G. A. Daniels (CEC) USNR, and Lt. J. A. Coddington (CEC) USN were resident officers in charge of projects A and B respectively. Jack Stetler was superintendent for Harris on Hangar A, while on Hangar B, L. R. Hamilton was superintendent and F. L. Metsger, field engineer, for American Bridge.

Dredged Depth Measurements Aided by Double Target Row

SOUNDINGS to measure progress and as a basis for payment to the dredging contractor were made in the approach channel and turning basin area at Marinship Corp. in California, with the aid of a double row of targets placed outside the area to be dredged. The soundings were made from a skiff, equipped with outboard motor, in which the crew used a light steel line for direct measurement while the skiff was kept exactly on the desired cross section by moving it so that two targets, with like numbers, were one behind the other. By this means soundings were made 50 ft. apart in each direction over a 2,300x9,300-ft. area.

The front row of targets, marking stations and half stations from 1 to 93, was set 300 ft. back from the toe of the 5:1 dredged slope. The back row was 300 ft. behind the front row, thus giving a good length of backsight for alignment. Adjoining target pairs were spaced 50 ft. apart. Instead of a steel tape the measuring line consisted of a $\frac{5}{32}$-in. galvanized cable such as is used for airplane controls. Lengths of cable were added as needed, the connections being made with bronze swivels and clips; at times 2,300 ft. was used on one reel. To prevent excessive sagging the cable was supported at 200-ft. intervals by floats consisting of sealed tin cylinders 3 in. in diameter and 18 in. long. This supporting interval with a pull of about 150 lb. (a steady pull with the motor) kept the measurements within the desired precision range. The cable was unreeled 50 ft. between successive soundings.



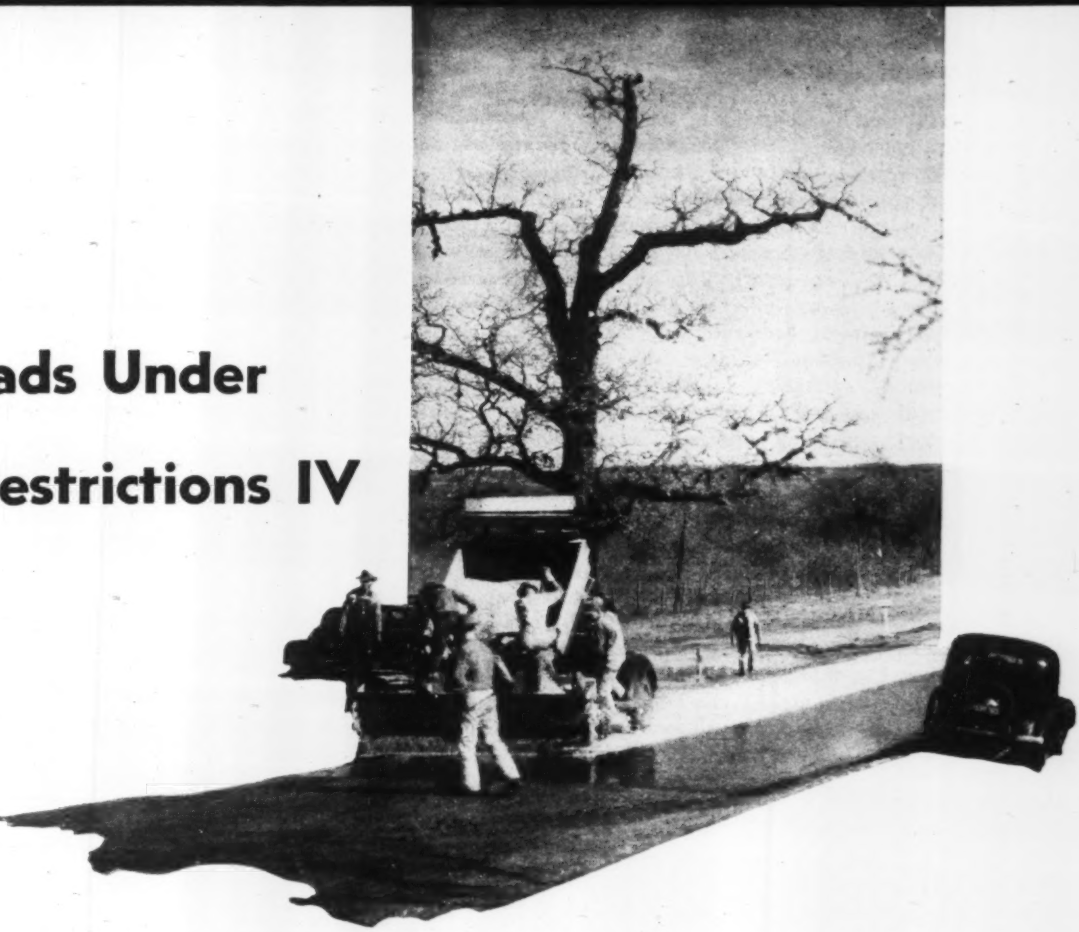
A pair of targets in the two rows, 300 ft. apart, is used to align the skiff from from which soundings are made.

The targets were made of 18x18-in. boards painted white and numbered with large black figures for easy visibility, each supported by a pair of 2x2's pushed down into the mud. At the inshore end of the row, the water depth was only 2 ft.; at the outer end where an 18-ft. depth obtained, splices and braces were needed to give sufficient stability to the supporting frame.

Only one transit was required in setting the rows of targets, and once the targets were set, all the soundings were made without need for an instrument. Platforms for the transit were erected at the middle point of each row of targets. When the targets were put in place they were lined up with the transit and located for distance by chainmen in skiffs.

The double target system of taking soundings was devised by John Stearns, assistant construction manager, Marinship Corp.

Roads Under War Restrictions IV



How STATE HIGHWAY departments in various parts of the country are meeting the problems raised by war restrictions has been the subject of inquiry by editors of Engineering News-Record on recent field trips. In the following is reported the manner in which these problems are met in two states of the Southwest, Arkansas and Texas, and in California which in addition to many war industries has problems induced by being in the "theater of operations." Earlier reports were in the issues of Oct. 8, p. 484; Oct. 22, p. 555 and Nov. 5, p. 627.

TEXAS ABANDONS WORK TEMPORARILY

AN UNUSUAL POLICY that permits contractors on state highway work to "desert" their jobs temporarily in order to take on work more closely related to the war effort, has been adopted in Texas. This departure from orthodox practice epitomizes the manner by which the highway department of the Lone Star State has adjusted itself to the exigencies of war.

DeWitt Greer, chief engineer of the department, pointed to the advantages of this policy. With construction activity in the southwestern region operating at a rate many times greater than its normal capacity, it was becoming exceedingly difficult to obtain contractors. Furthermore, it was honestly recognized that certain highway construction was secondary to the more immediate need for camps, airfields and related military facilities.

"It seemed only logical to conclude," said Mr. Greer, "that our contractors would contribute more effectively to the war effort and also give us better prices if they could feel free to come and go on highway projects. Accordingly, agreements have been made with contractors permitting them to suspend operations on roads and then return to the job between other more important projects. This plan has worked to the mutual satisfaction of all concerned."

This plan was put into effect in April following the issuing of WPB Order L-41 restricting construction work. The instructions issued to contractors at that time said "on those projects that are now under construction, and are not included in WPB Order No. L-41 as being essential to the national defense, we will be in a position to suspend same from time to time if the labor, materials, or equipment being utilized on same are needed on a bona fide defense project. This would mean that on a project that may be 50 percent complete at the present time but is not covered by the order as being essential to the national defense, and if the contractor shall apply to us with satisfactory evidence that his labor, materials, and equipment are needed on a bona fide defense job, then we will work out some type of agreement or permission for him to leave our job and go to the defense job and to later return to our job to prosecute further work on same."

Another liberal policy adopted by the department concerns personnel relations. Leaves-of-absence with a guarantee of salary upon return equivalent to that on departure, have been granted to all employees entering the armed services as well as to those engineers who have taken jobs with the U. S. Engineer Corps or related engineering organizations in a civilian capacity. Some 300 engineers, representing about 42 percent of the department's staff, are now directly engaged in war activities. On the Pan-American Highway, for example, there are 44 men, and 12 men are working on the Alcan Highway.

Access road program

Most important item with which the department is concerned is access road construction. Since January 1941 some 620 miles of such roads have been built. The total cost to date being about $13,680,000. Most of these roads are of the intermediate type with a base made of local crushed rock and a bituminous surfacing.

Examination of the department's current program indicates that the commission has approved a total volume of construction and reconstruction in the amount of $36,000,000. Funds available for construction in the coming year possibly will total about $15,500,000, of which about $9,000,000 is to be spent on the military network system.

Where concrete pavement is used, Texas builds an unreinforced slab either 8 in. uniform thickness or a 9-7-7-9-in. slab. Both employ a dummy longitudinal center joint. Expansion joints are spaced 120 ft. apart and contraction joints at a maximum of 15 ft.

Repair part troubles

Of greatest concern at the moment is the problem of getting repair parts for equipment. Manufacturers and other sources of such supplies are unable to provide essential parts, and the future picture is a gloomy one.

Present needs are being partially met through the machine shop facilities established in the 25 districts of the highway department organization coupled with the ingenuity of the men who operate them. Welding techniques are widely applied in the reconstruction of broken parts. But, by and large, equipment maintenance without proper replacement parts is proving to be an expensive business.

Maintenance on a road system of 26,000 miles is a major activity in Texas, the yearly cost of which is about $11,000,000. In order to conserve manpower and equipment, only essential work concerned with patching, drainage and shoulder stabilization will be undertaken, according to M. B. Hodges, maintenance engineer.

Such activities as weed cutting, painting, and perhaps even striping, will be greatly curtailed in the coming year. In fact, all those things related to good "housekeeping" eventually may have to be eliminated including, of course, the attention usually given to roadside parks.

Rationing and revenue

Regarding the effect of the rubber shortage and gas rationing on revenues, it is Mr. Greer's estimate that there will be a 30 percent reduction in license fees and a 42 percent drop in gasoline tax receipts. Anticipated revenue from both sources is estimated to reach $21,000,000.

The importance of automobile roads in Texas is best appreciated by the fact that some 40 percent of the people in the state are not served by railroads and depend entirely on highway transportation facilities. Couple this with the further knowledge that Texas plays a major role in the production of cattle, oil and farmstuffs essential to the nation's economy. It then becomes clear why Texas needs an effective highway system to participate fully in the war.

MANPOWER SHORTAGE IN ARKANSAS

With the chief engineer in the Army and the loss of some 500 men either through the draft or the lure of higer pay in war jobs, a major problem of the Arkansas State Highway Commission is shortage of manpower. But that is only one of the headaches with which W. W. Mitchell, director-chief engineer of the commission, has had to cope.

When Mr. Mitchell was interviewed late in October he had just finished a three-hour conference with the governor and the road commissioners on matters relating to future policy. No definite conclusions were reached at the meeting because it was too early to estimate the effect of gas rationing on tax revenues; rationing doesn't go into effect in this state until December 1. Thus far gas tax receipts are only 10 percent below those of last year. Preliminary estimates of the commission are based on a 40 percent reduction in revenue.

In the past Arkansas has spent about $3,500,000 annually for road maintenance. Uncertainty of future income will make it necessary to adopt a program by which maintenance funds will be doled out on the basis of traffic load. Traffic density studies are made continuously and they will be a determining yardstick in measuring maintenance needs on various parts of the highway network. Roads that are little used in the war effort will have small claim for attention.

Repair parts unavailable

Another factor affecting maintenance, in addition to lack of manpower and adequate finances, is the difficulty in getting repair parts for equipment. The commission had a low inventory on parts, and what is worse, has had little success in getting replacement supplies. Particular misfortune had been experienced with road graders, blades for which are unavailable.

Valuable aid in maintaining some equipment has been given by the National Youth Administration. This organization has a well-equipped machine shop and foundry with trained personnel in Little Rock. For more than a year the commission has enjoyed an arrangement with the NYA by which repair parts are made from metal supplied by the commission. Conveyor rollers, spur gears and metal cabinets are on the list of things made in the NYA shops. Recently this shop succeeded in rebuilding grader blades by welding together two worn out blades; the resulting part has about two-thirds the service life of a new blade.

New construction activities center largely on access roads. Nine roads, totalling some 30 miles in length, have been built; they consist variously of concrete, bituminous and gravel types of construction.

Carried over from last year there is some $1,500,000 of new construction to be completed. Major item in this category is a 14-mi. stretch on U. S. 65 costing about $700,000; this is being built of plain concrete, with a thickness of 9 in.

To illustrate the difficulties of working under present priorities control measures, Mr. Mitchell cited one project on which all the grading and paving was completed but the road cannot be opened because treated timber to build several small bridges is unobtainable.

No troubles have been experienced yet in getting asphalt, the probable reasons being that the state has several refineries within its boundaries and because Arkansas encompasses a strategic area containing military establishments and war industries, all of which require access roads.

Incidentally the commission has agreed to maintain all paved access roads for the duration without reimbursement. This policy is justified, Mr. Mitchell, since some of these roads will carry civilian traffic, and all of them are aid in producing revenue from gas taxes. Annual maintenance costs on the concrete access roads are expected to be about $200 per mile.

In addition to his burdens as director of highways, Mr. Mitchell also assumed the duties of chief engineer on July 27, when W. W. Zass obtained leave of absence to accept a commission in the Corps of Engineers. Major Zass now is stationed in Nicaragua where work is being done on a portion of the Pan-American Highway.

CALIFORNIA'S FOUR-FOLD PROBLEM

California is feeling the effects of war more intensely than the majority of states, according to C. H. Purcell, state highway engineer, because it is a principal gateway to a very active war zone and much of its area has been declared by the military to be a "theater of operations." Thus, in addition to the drastic effects of wartime priorities and material shortages common to all states, California highways are being affected by the military traffic incidental to the actual conduct of war and must also meet the heavy demands of numerous Army, Navy and Marine Corps establishments as well as rapidly expanding war industry plants.

Military and industrial expansion under these conditions has resulted in extensive construction operations throughout the state, accompanied by serious concentrations of traffic congestion and unprecedented volumes of heavy trucking.

Changes in volume of traffic

During 1941 and the first months of 1942, all traffic on California highways showed continued rises in volume. Since March of 1942, however, a steady decline in total traffic volumes has occurred, shown clearly by comparison of traffic counts throughout the state for July, 1942, with the counts of July, 1941. The average decrease in total traffic volume on state highways was 17.7 percent; the greatest decrease was 55 percent on one interstate route, but in general, recreational routes showed the heavier traffic losses. This decrease in total volume has been accompanied by notable increases in bus and truck traffic, with a particularly sharp rise in heavy hauling.

At the same time there have been general traffic increases on arterials which feed into areas of concentrated industrial activity. On one such arterial, where conditions lend themselves to accurate records, the fiscal year ending June 30, 1942 showed an increase of 14 percent over the previous year, and the months of April, May and June showed increases of 9 percent over the previous three months. On this route there was an increase in the number of busses, from 7,000 in January to more than 11,000 in June; trucks increased from 24,200 in January to 27,500 in June. On another arterial serving an important industrial section, the July, 1942 total traffic count showed an increase of nearly 18 percent over July 1941.

These increases in bus and heavy truck traffic have accelerated damage to highway surfaces. Destruction of road surfaces bears a direct relationship to the repetition of wheel loads and the great increase of hauling equipment with heavy axle loads has forcibly demonstrated this relationship during the past months of defense and war conditions. Roads that had served normal traffic satisfactorily and had been maintained in good condition over a number of years, disintegrated rapidly when the traffic suddenly increased the repeated wheel loads of heavy hauling operations. This highway destruction adds to the seriousness of maintenance problems already complicated by the necessary slowing up of the reconstruction program.

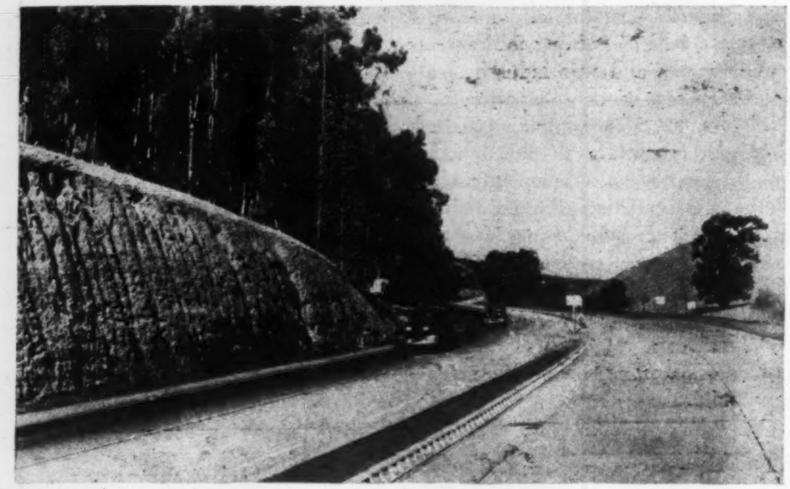
These conditions, coupled with the difficulties in securing materials, replacements for worn-out equipment, repair parts and supplies and the difficulty in obtaining capable personnel to replace men entering the armed forces or defense industries, necessitated a complete review of the maintenance program early in 1942. This review culminated in reduction in the amount of work and the elimination of certain features.

Maintenance work so affected includes such aspects of improved service as reduction in traffic striping, highway lighting, weed eradication, spraying and burning roadside vegetation, care of trees and shrubbery, snow removal, sanding icy pavements and the placing of non-skid surfacing. In addition, standards of maintenance are being lowered generally with less attention to secondary highways and work concentrated on major routes in proportion to essential traffic use.

As an example of required retrenchment, the federal-aid landscaping program has been deferred for the duration. The conservative policy of landscaping pursued during the past two years has fortunately lent itself to economical maintenance. Watering of trees and shrubs has been curtailed by half, as this is considered the minimum that will keep the plants alive. Tree maintenance crews have been reduced from 75 men to a total of 52.

Construction resources taxed

While the state highway construction has been reduced to work vitally essential to the war, the volume of federal access-road construction in some sections of the state has been so large as to tax the resources of the department and of contractors.



California's well built highway system is repaying large dividends in making it possible for the state to handle greatly increased traffic due to the war.

The access-road program developed for California included road and bridge projects requested by the military totaling more than $45,000,000 in value. Between the time of Pearl Harbor and Nov. 1, 1942, the California Division of Highways has placed under construction 81 access and flight strip contracts, including work estimated to cost nearly $21,000,000. In addition, projects totaling more than $10,000,000 for similar construction have been prepared and are pending federal certification or assignment of priority preference ratings. Remaining projects have been deferred temporarily by federal authorities.

Limitations should be modified

Necessary federal restrictions on the normal use of materials and equipment have made all highway activities increasingly difficult. The limitations of Conservation Order L-41, its amendment L-41-600, Order M-208 restricting lumber, the required certificates of necessity for bituminous products, and the scarcity of cement all curtail construction on operations vital to prosecution of the war. This curtailment is most essential but the present problem, however, is to gain relief from the difficulties attendant on securing priority preference ratings, under federal limitations, for construction compatible with the highway transportation facilities necessary for maximum aid to the war effort.

It now requires from one to three months to secure a priority rating from the War Production Board and in many cases rating conditions have so changed during this time that the contractor has a real struggle to complete the work on the rating assigned. Particularly on certified access road construction, there should be no delay in assigning a rating equal to that of the establishment served by the access project.

One of the chief difficulties is occasioned by the assignment of split ratings. On the same project ferrous materials are given one rating and equipment repair parts a much lower rating. Prompt delivery of repair parts is just as essential to construction progress as is delivery of materials that go into the work, but the low ratings now assigned to repair parts cause contractors serious delays. The Public Roads Administration is of real service in coordinating with the WPB in securing the assignment of ratings and it is felt that conditions will improve as the WPB comes to an understanding of the relationship of all phases of the work to construction progress.

COMPARATIVE NUMBER OF CALIFORNIA STATE HIGHWAY EMPLOYEES ON FOUR SUCCESSIVE DATES

	July 1941	January 1942	July 1942	October 1942
Engineering personnel	2,457	1,257	1,175	1,122
Maintenance personnel	3,297	3,380	2,529	2,439
Clerical personnel	710	742	716	724
Other personnel	342	333	334	297
Totals	5,806	5,712	4,754	4,592

War depletes staff

In addition to these problems confronting the department, is the depletion of the highway staff by the great number of persons entering the military service or taking up work with war industries. Since January 1941, nearly 400 engineers and trained personnel have left the state highway department to join the armed forces and 2,500 others have resigned to accept more lucrative employment with industrial organizations. The accompanying tabulation showing the comparative number of state highway personnel on four successive dates clearly indicates the man power problem that confronts the state today.

Although the California Division of highways is at present engaged in the construction program of access and defense roads financed almost entirely with federal funds, the imminent reduction in gas tax revenue will have a marked effect upon state highway activities. The heavy maintenance burden which will result from curtailment of the reconstruction program on the state highway system will be further increased by the reduction in state revenue.

It is estimated that in a few months the effects of gas rationing, rubber shortage, and speed limitation will reduce gas tax revenue, as compared to last year, by 35 to 50 percent. Similar reductions in the revenue from registration fees may be expected. Under California statute, which limits expenditures for maintenance and administration to the net receipts from one cent of the gas tax, the reduction in funds available for maintenance will present a most serious side to the problem.

To summarize: the four factors which will have the most direct effect upon the condition of the state highway system for the duration will be inadequacy in (1) finances, (2) equipment, (3) materials and (4) man-power. For the solution of this four-fold problem, the Division of Highways staff will muster all its resources and talents.

Landfill Disposal Wins Army Favor

Contents in Brief—*To meet the need for sanitary and low-cost disposal of refuse at camps, the Army is inaugurating landfill operations. Procedures have been formulated, equipment has been selected, and field men are being trained to carry on this work. Not only will the sanitary fill method provide a means for refuse disposal, but it is expected that low-lying areas adjacent to camps will be reclaimed for drill ground, parking and recreational uses.*

HUNDREDS OF ARMY CAMPS and posts throughout the country are now using or planning the adoption of a sanitary fill method for the disposal of refuse. This action followed an order from the chief of engineers last summer directing that an investigation of landfill disposal be made in order to eliminate the need for refuse incinerators, the construction of which calls for the use of critical materials.

While it is too early yet to describe operating experiences, it can be reported that procedures have been formulated and equipment selected to promote the use of landfill disposal methods. Much study was given to this preliminary work by Colonel Fenn Lewis, chief, Repairs and Utilities Branch, Corps of Engineers, and Jean Vincenz, chief of the civilian specialists attached to the branch. Mr. Vincenz, who went to Washington on leave of absence from his post as director of public works at Fresno, Calif., has been one of the pioneers in the development of sanitary fill disposal methods in this country.

Broadly speaking, the landfill procedure as outlined for army camp application is similar in technique to that employed in some municipalities. It involves excavation of a shallow trench to secure a supply of earth cover material, deposition of refuse in this trench to a piled height of about 6 ft., compaction of the deposited material with a tractor and prompt covering of the refuse with at least 18 inches of earth (graphic representation of these operations is shown in Fig. 1).

Perhaps the greatest departure from any previous practice—at least so far as equipment is concerned—is the Army's adoption of a unit recently developed by the Hi-Way Service Corporation of Milwaukee, known as a "bull clam" shovel. (Fig. 2.) This mechanism, attached to a tractor, is capable of performing as a scraper, a bulldozer and a power shovel. It combines in a single unit means for excavating trenches, leveling refuse piles, digging, moving and spreading cover fill, as well as compacting deposited material.

Such versatility in a single machine admirably adapts it for landfill operations at camps up to 20,000 population.

Outlining the procedure to be followed at camps, the Army instructions emphatically open with the statement that sanitary fill operations are not to be confused with ordinary

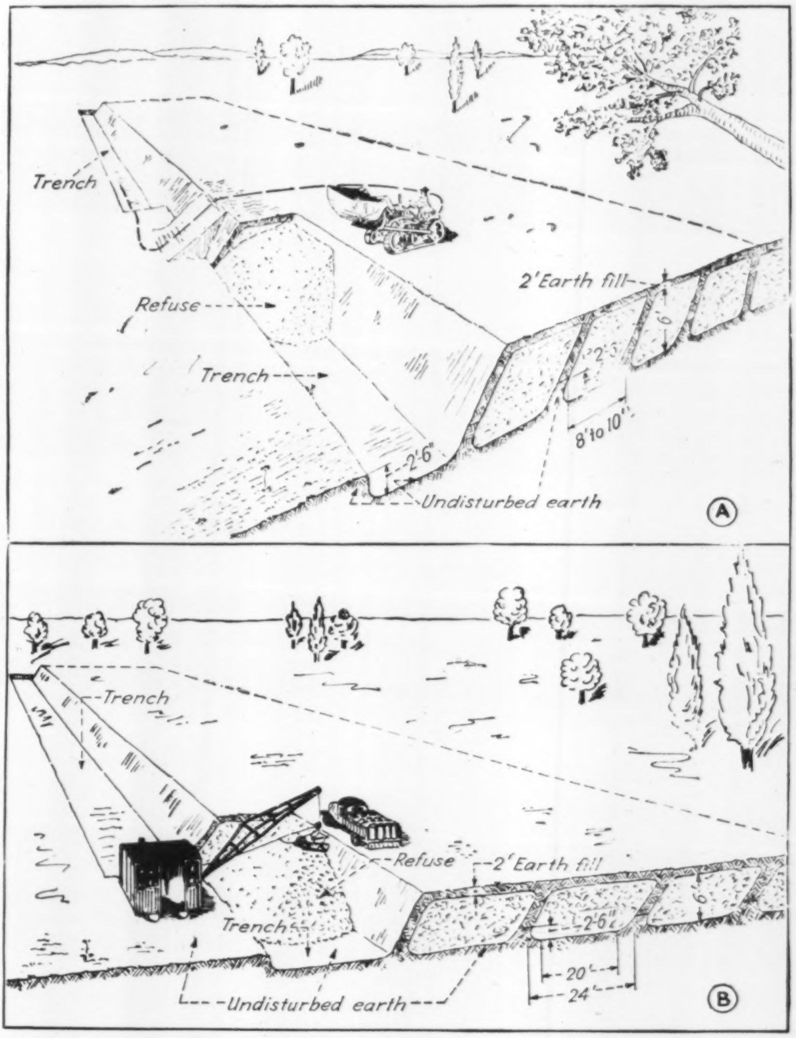


Fig. 1. Recommended methods for conducting a sanitary refuse-disposal fill at Army camps. In the upper diagram (A) is shown the practice for camps whose population is less than 20,000; here a "bull clam" shovel attached to a tractor is the principal piece of equipment used for digging trenches, compacting refuse and applying the earth seal. At camps with a larger population, a power shovel supplants the tractor-shovel combination.

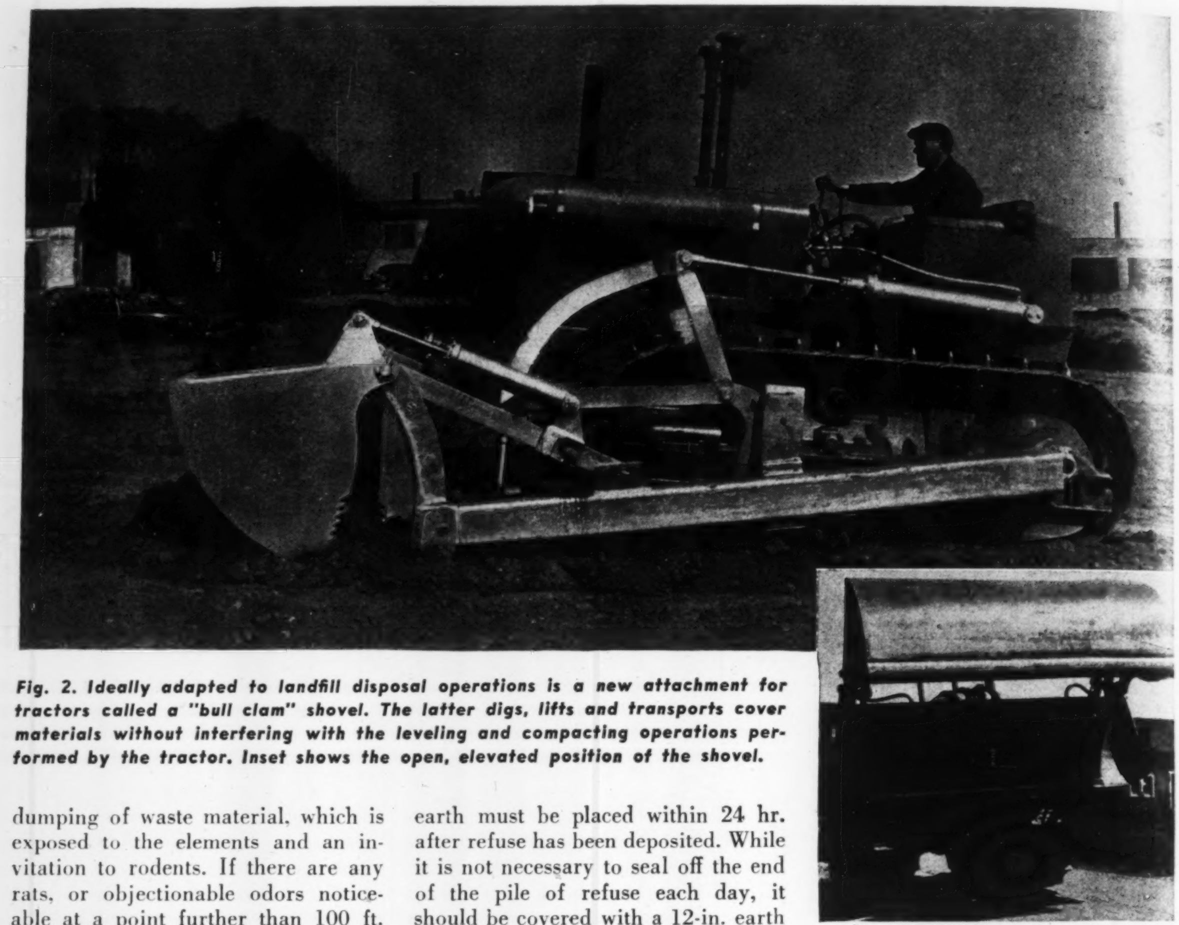


Fig. 2. Ideally adapted to landfill disposal operations is a new attachment for tractors called a "bull clam" shovel. The latter digs, lifts and transports cover materials without interfering with the leveling and compacting operations performed by the tractor. Inset shows the open, elevated position of the shovel.

dumping of waste material, which is exposed to the elements and an invitation to rodents. If there are any rats, or objectionable odors noticeable at a point further than 100 ft. from the point of operation, a proper job is not being performed. Further, for psychological reasons, no open burning of any kind is permitted within 1,000 ft. of the operation. Otherwise, it is stated, the sanitary fill will be charged with the onus of smoke and odor.

Starting the fill

In starting the fill a trench must be dug from 30 to 70 in. in depth, the earth from which is used to build a ramp from which the collection trucks will discharge their loads. This trench is dug for a length anticipated to provide space for about two months disposal of refuse. After the initial fill has been completed the depth of succeeding trenches need be sufficient only to supply adequate cover material for both the top or surface and the side slopes.

Top cover material is directed to be never less than 18 in. of compacted earth and preferably should be 24 to 30 in. in thickness; thickness of the earth on the outside slope is not to be less than 12 in. Top and side cover of earth must be placed within 24 hr. after refuse has been deposited. While it is not necessary to seal off the end of the pile of refuse each day, it should be covered with a 12-in. earth seal at the end of each week and preferably also at mid-week.

The covering operation to completely seal a cell is designed to prevent the escape of rodents that may be harbored in the refuse and to act as a fire break in case the material in any one cell should become ignited.

As shown in Fig. 1, the recommended depth of fill is 6 ft. of compacted waste material. Experience has proven that this depth should never exceed 10 ft. in order to avoid uneven settlement.

The width of the trench is from 8 to 10 ft. at the smaller posts and 20 to 24 ft. at posts where the dragline is used. In the second and succeeding trenches the depth is determined in large measure by the amount of refuse deposited and the need for earth cover. Best results will be obtained in operating the fill if the width and length of the trench used each day is such that refuse will form a square or slightly rectangular unit.

It is suggested that the surface of the fill be graded to provide adequate drainage of rainfall. To accomplish this a flat valley may be formed in the top of the fill parallel to the line of trenches; the surface of the fill drained by this valley should have a slope of about one foot in 100 ft.

Since trucks will be driving continually over areas previously filled it is desirable to maintain a temporary road leading to the face of the fill. An adequate road bed generally can be formed by spreading crushed rock, gravel or cinders.

To prevent loose papers and other debris from blowing about, it is recommended that movable snow fence or similar fencing facilities be maintained close to the working base of the fill.

Size of fill site

The total area required for a sanitary fill depends entirely upon the population served and the proportion of the waste material to be placed in the fill. It is estimated that the combined garbage and rubbish from an army camp is 2.4 lb. per capita per day. If all of this is disposed of in a landfill, an area of one acre would be required for a population of 10,000 troops over a period of one year.

It is advisable to select a site that is relatively close to the source of supply of refuse. This is done in order to reduce the length of haul, thereby reducing operating cost. Unlike the selection of a site for dumps and incinerators, which must be remotely situated, the sanitary fills can be safely located close to existing buildings.

Since there will be some settlement in the filled area over a period of five or six years, the site should not be in an area chosen for future building expansion. However, the filled area does make an ideal recreation area or parking space for vehicles.

Sanitary fill operations are most conveniently carried out on level ground or in low areas, state the instructions. It is pointed out, however, that fills also can be successfully made in abandoned gravel pits or other depressions. If a pit or depression is greater than 10 ft. in depth, it is advisable to use two layers of fill instead of one fill. In such cases the bottom layer of refuse should be covered with 3 ft. of earth instead of the usual 24 in. so that later some two feet of this covering may be taken up for use as cover material over the final deposit of refuse without actually uncovering the bottom layer. It is suggested that the bottom layer be completed before starting the second layer in order to provide opportunity for settlement to take place.

In areas where frost penetrates 24 in. or more the following methods are suggested to provide cover for the fill during the coldest months: (1) Place a cover of marsh hay or straw over the surface of the ground area which is expected to be used during this cold period; or (2) excavate trench in advance of actual need and stockpile the earth as loosely as possible, covering the stockpile with marsh hay or straw. During the cold season it will be considered satisfactory to cover only to a depth of 6 in., but the full depth of cover must be provided as soon as possible.

Putting fill into use

Future utilization of the area covered by the sanitary fill should be planned carefully. Such areas should be returned to use as quickly as possible, in most instances this being six months after the fill is completed.

Certain limitations in the use of the filled area should be observed, however; these include:

Settlement may be expected to continue, although in decreasing degree, for a year or more.

Construction of buildings of any considerable weight should not be attempted on the fill before a three- to five-year period has elapsed. Under concentrated pressure, such as from foundation of a building, uneven settlement should be anticipated, thus pointing to the desirability of using a continuous beam design for foundations.

No difficulty should be expected in putting the filled areas to such uses as parking of vehicles, storage of materials and for drill grounds and recreational purposes.

To carry out effectively the sanitary fill operations, the following recommendations have been made regarding equipment.

Camps of less than 20,000 population: One 35-hp. tracklaying tractor equipped with a bull clam shovel of 1 cu.yd. capacity.

For camps of 20,000 to 50,000 population: One ⅜-cu.yd. tracklaying power shovel fitted with a 30-ft. boom and a ⅜-yd. dragline bucket.

For camps of 50,000 population and greater: One ¾-yd. tracklaying power shovel fitted with a 40-ft. boom and a ¾-yd. dragline bucket.

Crane Overload Warning Device Prevents Accidents in Shipyards

Serious accidents in shipyards resultant from overloads on cranes have brought about the development of a device that gives warning signals to crane operator and to crews on the ground if the crane attempts to lift a load exceeding the rated capacity of the crane at any boom radius. As the capacity varies inversely with the boom radius at which the lift is made, two variables are involved in determining safe loads: (1) the weight lifted and (2) the boom radius at which the lift is made.

Indication of the load is made by a well-known device employing the principle that deflection in a short length of dead line in the block assembly is proportional to the stress in the cable. This indication goes to the crane cab by a hydraulic system. The radius indicator makes use of a column of fluid attached to the boom and passing through a fixed point. As the boom is raised or lowered, thereby causing variation in the pressure at the base of the column, these changes are indicated in the cab on a gage calibrated in terms of feet of radius.

These two hydraulic systems (load lifted and boom radius) terminate at bourdon tubes in the cab where their records are read directly. Supplementing these indications, new features have been specially designed to give signal light and horn warnings of overload for use at the Calship and Marinship yards. This is accomplished by two electrical contacts that are made part of the bourdon tube assemblies. One contact consists of a sterling silver cam attached to the boom radius indicating movement. A second sterling silver contact is attached to the weight indicating movement. Contact surface of the cam is cut to correspond to the load curve of the boom and is adjusted to make contact for alarm just above the capacity at any boom radius. Decreasing the boom radius widens the span between the two contact points and permits a greater load lift before the overload alarm makes contact.

A separate alarm cabinet has been provided, consisting of a 110:24-volt transformer, a pilot light for visual alarm and a horn. The alarm cabinet is mounted on the crane cab and a 110-volt circuit is brought from the lighting panel in the crane cab to the transformer in the cabinet. The 24-volt secondary from the transformer is connected through the alarm contacts in the gage case to both the horn and the light in the alarm cabinet. An additional horn below the cab warns the ground crew.

This adaptation of the load limit warning device (built by the Martin-Decker Co., Los Angeles) has been devised by the electrical department of the Bechtel-McCone-Parsons Corp., Los Angeles, for use at Calship and Marinship yards.

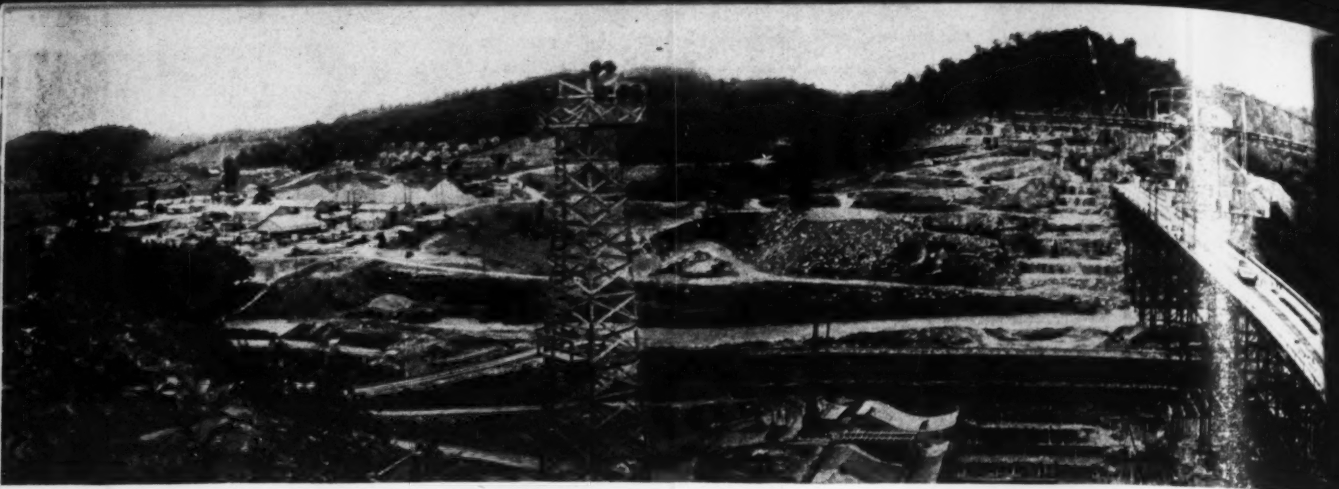


Fig. 1. View from south abutment showing hammerhead cranes, concrete plant, truck batcher and aggregate storage.

Big Concrete Plant Speeds Power Dam

***Contents in Brief**—To place 525,000 cu.yd. of concrete in 12 months for a large dam, the general contractor has installed a concrete plant capable of placing a maximum of 4,500 cu.yd. daily and to average 2,000 cu.yd. Most of the concrete is placed by 4 cu.yd. buckets handled by two hammerhead cranes operating on a 125-ft. high trestle upstream from the dam. In addition, a paver operating downstream is placing between 300 and 400 cu.yd. daily in the areas out of reach of the cranes. An extensive belt conveyor system, totalling over 3,400 ft. in length, distributes aggregate and sand.*

CONCRETE EQUIPMENT that would ordinarily make the job "overplanted" is being employed to construct in one year a large dam, which is a 525,000-cu.yd. concrete gravity structure for power and flood control. Construction of the dam started late in February of this year, concrete placing is scheduled for completion next April, storage of water started last fall, and power deliveries are to begin in the fall of 1943. Such a program meant that major emphasis had to be placed upon the concreting work if the job were to be completed on schedule. To meet the fast schedule two hammerhead cranes have been installed for placing the greater part of the concrete. Incidentally, the cranes and much of the other concreting equipment has been shipped nearly across the nation from another dam site.

This dam, the location of which cannot be given, is being built by the U. S. Engineers. The terrain at the site is highly favorable for the construction of an all-concrete structure with the height limited only by the economics of power generation for the available stream flow. The stream is about 150 ft. wide and the flood plain about 600 ft. wide. Sound limestone bedrock with the strata nearly horizontal is generally within 15 to 25 ft. of the ground surface in the flood plain. Rocky sides rise at 1 to 3½ slopes on both walls of the valley. The drainage area above the dam is 935 sq. mi.

Dam to be 200 ft. high

A concrete gravity dam of 200 ft. maximum height is under construction to provide a total storage of 1,639,000 acre-feet in a reservoir area of 29,970 acres. Of the storage capacity 339,000 acre-feet will be for flood control and the remainder for power. The dam will consist of a 630-ft., non-overflow section and a 255-ft. powerhouse at the north end, a 400-ft. spillway surmounted by six 12x60-ft. tainter gates near the center, and a 432-ft., non-overflow section forming the south end, making the total length 1,717 ft. Two 18,000-kw. power units are to be installed with the present program and the design provides for adding a similar unit at a later date.

General arrangement of the sand and aggregate storage yard, which is located about ¼ mi. downstream from the dam, is shown in Fig. 2. Sand and four sizes of stone, 6, 3, 1½ and ¾ in., are available. At the site, storage space is provided for 40,000 cu.yd. of sand and for 12,000 cu.yd. of each size of aggregate. Natural sand is obtained from the river 4 mi. downstream from the dam site and it is delivered by truck. The sand is dumped at the end of a 30-in. belt conveyor 350 ft. long and at a point where it can be blended with manufactured sand made from crushed limestone, if this scheme proves feasible. The 350-ft. belt discharges onto the 40,000 cu. yd. storage area previously mentioned.

The aggregate is obtained ready for use from a quarry 7 mi. away, where two crushers, each of 175 tons hourly capacity, are installed and up to 75,000 cu.yd. of crushed material may be stored. Aggregate is delivered by truck and, upon arrival at the storage yard, the trucks dump into hoppers feeding four belt conveyors each 200 ft. long and 24 or 30 in. in width, each belt delivering one size of material to the storage pile.

Reclaiming tunnel of timber

Running under the sand storage and the four aggregate piles is a 9 x 9-ft. arched top reclaiming tunnel encased by 3 x 8-in. rough oak and chestnut timbers (Fig. 3). Construction of the tunnel, which is nearly 1,000 ft. in length, required a total of 500,000 b. ft. of timber but eliminated the need for a large amount of steel. The tunnel houses a 36-in. belt conveyor and four chutes are provided to load the belt with sand and three chutes for each size of aggregate.

The 36-in. belt extends about 350 ft. past the upstream end of the tunnel, and feeds two other belt conveyors, one 36-in. belt 800 ft. long leading to the main mixing plant about half way up the hill forming the north abutment of the dam and a 30-in. belt 350 ft. long leading to a truck batcher plant about 600 ft. downstream from the centerline of the dam. Aggregate storage in the mixing plant includes 300 cu.yd. for each size aggregate and 275 cu.yd. for sand. All of this storage is in bins above the four 4-cu.yd. mixers, which are also a part of the equipment formerly used at another dam.

Cement storage at the mixing plant consists of 10,000 bbl. in three steel silos and 600 bbl. in a bin above the mixer. The bulk cement is delivered by truck from a railroad siding at a town 37 miles away, as are steel and the other required building materials.

Water for the concreting work is obtained from the river a short distance downstream from the dam site and is pumped to a 1,300,000-gal. reservoir created by a low earth dam. Water is drawn from this reservoir to a 100,000-gal. steel tank high on the north abutment back of the mixing plant. From here the water flows by gravity to the mixing plant and other equipment as needed.

A 2½-min. mix is used and the four 4-cu.yd. mixers are served by standard batching equipment. The concrete is distributed in 4-cu.yd. buckets handled by a double-track railroad on the deck of the steel-bent, 125-ft. high trestle upstream from the dam and upon which the previously mentioned hammerhead cranes operate. Equipment for the railroad, which was also used at another dam and which extends under the mixing plant, includes two 12-ton diesel-electric and two 8-ton diesel locomotives and five railroad cars, each capable of transporting five 4-cu.yd. buckets.

The buckets are delivered to the forms by the two hammerheads. These cranes, each of which cost about $80,000 when purchased for use at a previous dam, are equipped with direct current equipment for accurate control and lifting speeds of 750 fpm. They can travel 125 fpm. on the 38-ft. gage track and have an overall span

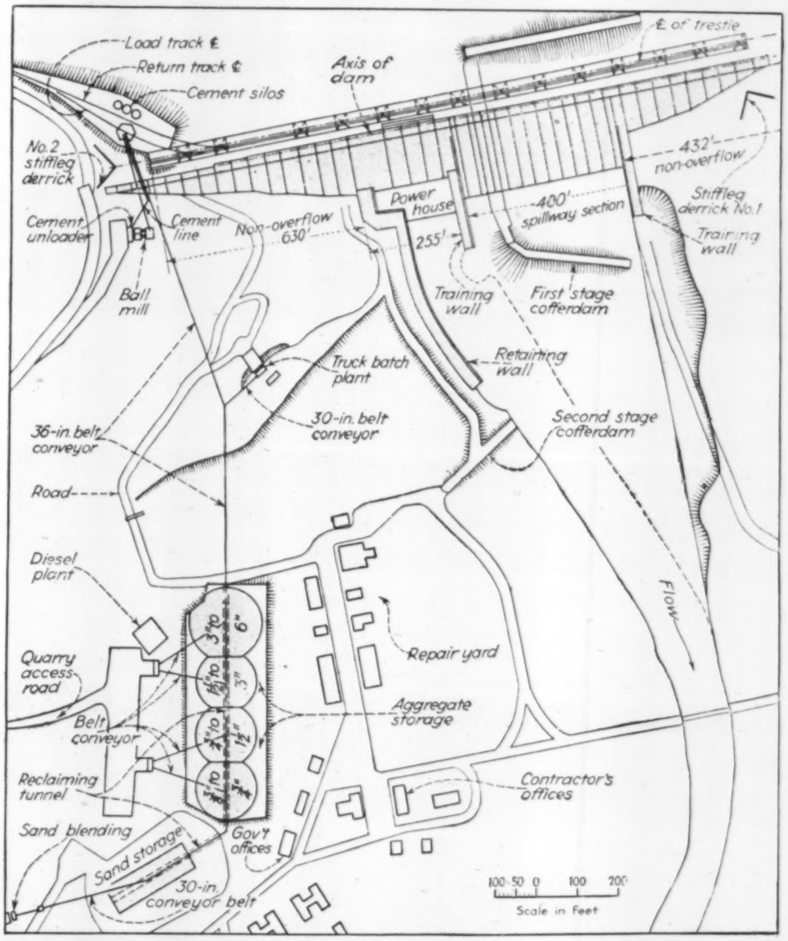

℄ of trestle
Load track ℄
Return track ℄
Axis of dam
Cement silos
No.2 stiffleg derrick
432' non-overflow
Stiffleg derrick No.1
Power house
400' spillway section
Cement unloader
Cement line
Non-overflow 630'
255'
Training wall
Ball mill
Training wall
First stage cofferdam
Truck batch plant
Retaining wall
30-in. belt conveyor
Second stage cofferdam
36-in. belt conveyor
Road
Diesel plant
3" to 6"
1½" to 3"
¾" to 1½"
⅛" to ¾"
Flow
Repair yard
Quarry access road
Aggregate storage
Belt conveyor
Reclaiming tunnel
Contractor's offices
Sand blending
Sand storage
Gov't offices
30-in. conveyor belt
100 50 0 100 200
Scale in Feet

Fig. 2. All concreting materials are trucked to the site and are distributed by the extensive belt conveyor system illustrated. Final placing of most concrete is by the two hammerheads operating from the trestle upstream from the dam.

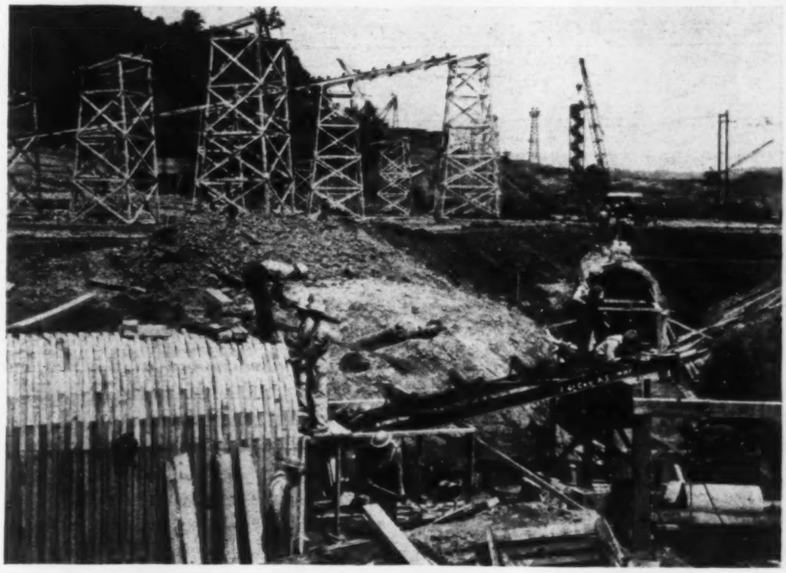


Fig. 3. The reclaiming tunnel extending under the sand and aggregate live storage piles was constructed of wood, 500,000 b. ft. of rough oak and chestnut being required. Note how towers for the four belt conveyors delivering stone to the aggregate storage yard are also made of timber.

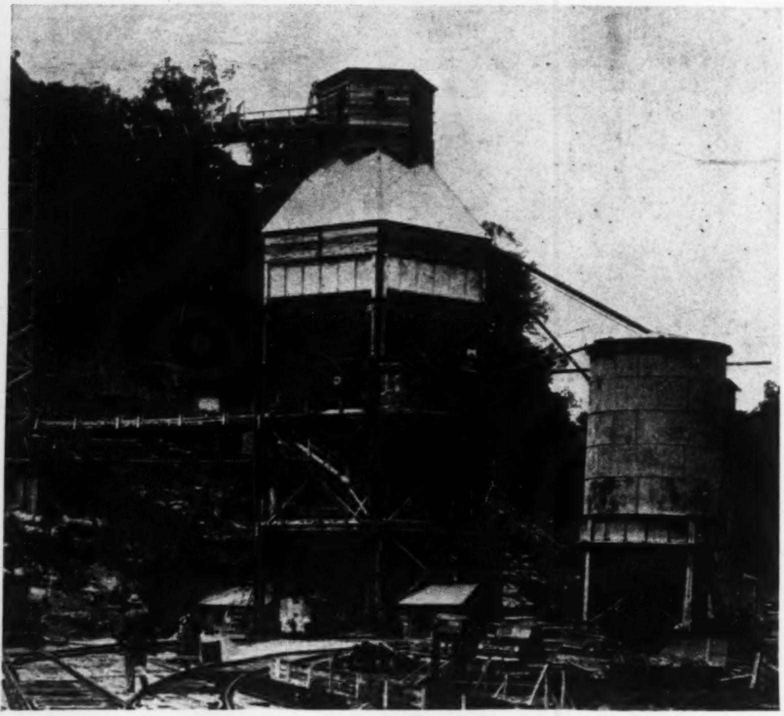


Fig. 4. On the south abutment just upstream from the trestle for the two hammerhead cranes is the main mixing plant, which is equipped with four 4-cu.yd. mixers. The railroad tracks are for the trains delivering concrete in 4-cu.yd. buckets to the two hammerheads.

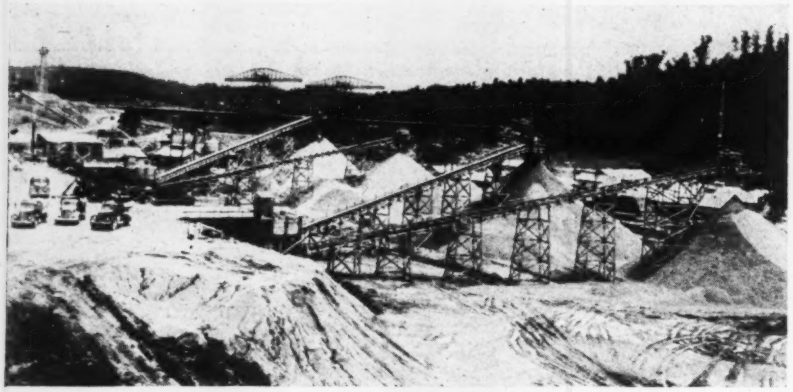


Fig. 5. Looking upstream from north side of river with the four belt conveyors leading to the live aggregate storage in the foreground and the two hammerhead cranes on the steel bent trestle in the background.

of 314 ft. A 72-ft. clearance under the arms is provided. The frames also will be used for delivery of steel and timber in construction of forms, and in placing roughly 495,000 cu.yd. of the required concrete. A large stiff-leg derrick at the north end of the trestle upon which the cranes operate is used in loading the steel and other materials onto the cars of the railroad previously mentioned.

Since concrete can be delivered by the hammerheads for only a distance of 90 ft. downstream of the trestle, some other method had to be devised for placing the small amount of concrete past this point. For the first 20 ft. the buckets are delivered by the hammerheads and swung over by use of a cable from a winch on a bulldozer. For the remaining distance a 34E double-drum paver is being used and by placing about 400 cu.yd. daily it will supply in all about 32,000 cu.yd. of concrete for the training and retaining walls and the spillway bucket. A crane handling 2-cu.yd. buckets will deliver the concrete from the paver to the forms.

The trucks delivering materials to the paver are loaded at the previously mentioned truck batcher downstream of the dam. Sand and aggregate for this plant ordinarily are delivered by the belt conveyor system from the same piles as those supplying the large plant but, if necessary, they can be delivered by truck. Cement is delivered in bulk by truck, as with the large plant. For delivery of materials from this batching plant to the mobile mixer four two-batch trucks are used.

Cantilevered forms employed

Two cofferdams are to be employed in construction and the first, which may be seen in Fig. 1, is 39 ft. high and was built from Douglas Fir timber, 1,000,000 b. ft. being necessary for its construction. Douglas Fir was used as no nearer lumber supply in the required size and amount was available. Cantilevered forms are being used and the concrete is to be placed in alternate blocks in 5-ft. lifts. The one set of forms is expected to be used throughout, which means using each form 30 times.

An uncommon feature of the project is that three 1,250-hp. and one 375-hp. diesel electric units have been installed near the live storage yard to supply power for all the electrical equipment. These units will make the project independent of other power sources. It also has permitted concrete placing to get into full swing much sooner than would otherwise have been possible, since construction of a 40 mi. transmission line would have been necessary to deliver power to the site if electric current was purchased for the job.

Speed of the work depends greatly upon maintenance of the fleet of 100 trucks needed for delivering materials. For this purpose several repair shops have been set up near the storage yards. Many parts can be made on the job if necessary at a large, well-equipped machine shop.

Operations are to continue seven days a week and three 8-hr. shifts are employed. During the early stages of the work the average crew was about 1,150 men. With concreting in full swing, the contractor had about 1,000 workmen on the job.

Because of military reasons those in charge cannot be mentioned.

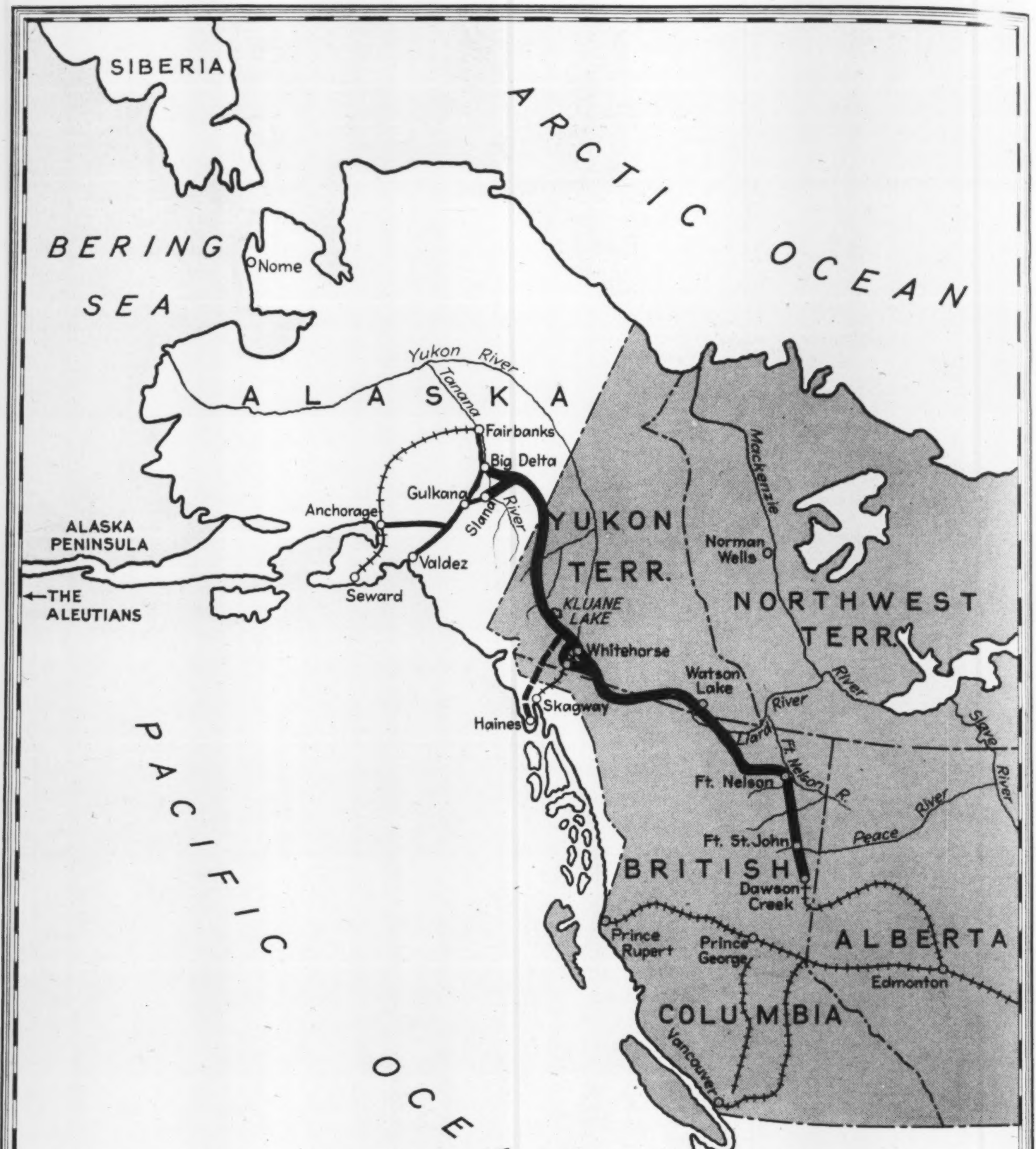
ALCAN

AMERICA'S GLORY ROAD

NEW YORK 3600
CHICAGO 2700
EDMONTON 1215
LOWER POST 15
LIARD RIVER 8
WHITEHORSE
TESLIN 172
TOKYO 4000

Alcan signpost — halfway to Tokyo

AN ENGINEERING NEWS-RECORD REPORT


SIBERIA
ARCTIC OCEAN
BERING SEA
Nome
Yukon River
Tanana
ALASKA
Fairbanks
Big Delta
Gulkana
Anchorage
Slana River
ALASKA PENINSULA
Valdez
Seward
←THE ALEUTIANS
YUKON TERR.
Mackenzie
Norman Wells
NORTHWEST TERR.
KLUANE LAKE
Whitehorse
Watson Lake
River
Liard River
Slave River
Haines
Skagway
Ft. Nelson R.
Ft. Nelson
Peace River
Ft. St. John
BRITISH COLUMBIA
Dawson Creek
ALBERTA
Prince Rupert
Prince George
Edmonton
Vancouver
PACIFIC OCEAN
Seattle
Scale in Miles
0
100
200
300
400
500
UNITED STATES

ALCAN—AMERICA'S GLORY ROAD

Part I—Strategy and Location

Harold W. Richardson
Western Editor, Engineering News-Record

• This and succeeding accounts of the construction of the Alcan Highway, stretching for 1,800 miles from Dawson Creek, B. C. to Gulkana and Fairbanks, Alaska, are largely based upon first-hand inspection of the road by the author. He was the first person—either army officer or civilian—to travel the full length of the highway as well as all its branches. At the final holing through of the pioneer road in the Yukon near the Alaska boundary he was the only civilian present, and it was his camera that made the sole photographic record of that historic ceremony. Engineering News-Record joins with the author in expressing thanks to the War Department, the Corps of Engineers, the Public Roads Administration and the contractors on the project for their wholehearted cooperation in making it possible to cover the work for the preparation of these articles. And to the many individuals out on the line who went far beyond the bounds of ordinary duty to be of service, particular thanks are extended.—The Editors.

"GUTS AND TRACTORS built that road," remarked a hard-bitten Colonel of engineers—one of several who led troops into the North to hack the Alcan Highway through the wilderness. The remark is symbolical, for it was the fortitude of men—officers and soldiers, engineers and contractors—and the stamina of American construction equipment that built 1,636 miles of new route and rebuilt 162 more miles of old trail, all in one short construction season.

Since mid-November trucks loaded with military supplies have been rolling into Fairbanks, Alaska, from Dawson Creek, British Columbia, 1,670 miles away—rolling over a highway that only last spring the experts said could never be built in time to be of use in this war. Those experts thought only of the uncharted and unmapped wilderness, the difficult supply problem, the muskeg, the streams, and the mountains to cross. They failed to consider the spirit, ingenuity and ability of U. S. engineer officers and troops, and of American and Canadian engineers and contractors when meeting the "impossible."

Like a jagged streak of lightning the highway weaves through northern British Columbia, clear across the Yukon and into eastern Alaska, where it ends in a forked tongue, one branch serving interior Fairbanks, the other reaching out toward the seacoast at Valdez. Engineer troops — nearly half of them colored—slashed out a pioneer road through all but 150 miles of the new route. They proved the "impassable muskeg" to be a myth; certainly, the muskeg was there, but the army locators ducked around it so successfully that they crossed less than 4 miles in one 265-mile stretch reported to be impassable, and without much difficulty at that. The troops forded small streams, used pontoon ferries and bridges on the larger rivers until pile trestles could be driven. They fought mud and bad weather, mosquitoes and other obnoxious bugs, subsisted at the ends of precarious supply lines, worked equipment without repairs or repair parts seven days and nights a week, and lived in camps offering only the bare necessities of life, without recreation or relief from the monotony of hard work.

The first regiment of troops on the project walked their heavy equipment—tractors, trucks, scrapers and shovels—overland for 325 miles in winter weather, 35 deg. below zero, to get it to an inland point before a frozen winter trail broke up behind them. Hard, tough soldiers driving tractors without cab protection literally cried from the cold, wrecks were frequent, meals very infrequent, yet they got through with their equipment and rations to last four months before they were isolated by spring thaws.

Other troops, working in the northern sector of the highway, learned to leave permanently frozen ground alone. They learned from experience it was best to leave the humus in place as insulation, to cover it up with brush and trees cleared from the site, then fill over the whole for the road. Through bitter and painful experiences the army learned how to build a road through the wilderness. Even reserve officers coming directly from highway engineering posts had a lot to learn about North Country road-building.

Engineer troops built the pioneer road. Behind them came a group of 54 contractors under the direction of the Public Roads Administration to build a standard road, using the army pioneer route as access. Such were

Advance troops walk their equipment 325 miles over the winter trail to Ft. Nelson in sub-zero arctic weather to attack the road at an interior point. Breaking up of the winter trail under spring thaws isolated the regiment for four months.

the original intentions, and the project started under those plans. However, by late summer the army authorities realized that specifications and standards under which the contractors were working were too exacting for fast construction. If the original plans were to be followed the advent of winter would find only an impassable pioneer road and short sections of completed standard highway. So the contractors were pulled onto the pioneer route, to shape it up, to gravel the surface, to widen and to improve the alignment and grade where possible in a short time. Meanwhile, as the various regiments completed their allotted sections of the pioneer route, they fell back and improved their original efforts, working with the contractors in some cases.

The part the contractors, their civilian employees, and the PRA engineers played in this achievement cannot be overlooked. They fought the same mud, the same bugs and mosquitoes, their supply lines were just as precarious, and their hardships just as great as those endured by the soldiers.

The result of these combined actions was the completion of a gravel-surfaced truck route the full length of the project by Nov. 20, the day the Alcan Highway was officially dedicated by United States and Canadian authorities at Kluane Lake, 165 miles west of Whitehorse, Y.T. The gravel surface is a minimum of 18 ft. wide, and for most of the distance it is 22 to 24 ft. All streams have been bridged by pile trestles. So today the highway is in useful military service. Of course the road is rough in spots, it is crooked in others, following the ground surface with a minimum of grading. Cuts and fills are scarce, sight distances are often short, steep pitches are not infrequent, but the objective of getting military traffic into Alaska this winter has been achieved, to the glory and credit of all concerned.

Some of the same soldiers who built the road are operating the truck transport system. Rest camps have been established from 45 to 90 miles apart, and drivers shuttle between these camps while the trucks run straight through. Service and repair facilities are located at the rest camps. Here also are snow fighting squads equipped with plows and rotaries. Some of the contractor outfits are remaining through the winter to augment squads of troops assigned to maintain and to constantly improve the road.

The Alcan Highway is a battlefront, exacting its toll of life the same as any other field of combat. A pontoon ferry on Charlie Lake capsized in a squall, drowning two officers and ten soldiers; a tug towing a barge load of equipment up the Alaskan Inside Passage went down with all hands in a storm. Several bridges and other local points of

HOW TO SAY IT

Pronunciation of geographical names found in the Northland is puzzling to the newcomer. Here are a few examples to aid the reader in following the map and text:

Kluane—Klew'-aw-nee
Sikanni—Sick'-an-nee
Tanana—Tan'-a-naw
Nisutlin—Ni-sut'-lin
Donjek—Don'-jeck
Dezadeash—Dez-a-dee'ash
Tok-Toke

interest have been dedicated and named in honor of some officer, soldier or civilian, who gave up his life in building the road.

Purpose and directives

An international highway to Alaska has been talked about for years, and in the past decade studies have been made by an international commission of engineers. However, it was not until we became engaged in war with Japan that the immediate necessity of the road was realized. The road was planned as a military supply route to Alaska that also would serve a string of airports established in 1941 through Canada and Alaska by the Canadian government and the U. S. Army Air Corps, respectively, and now in constant use by our air forces.

The Army General Staff turned the job over to the Corps of Engineers. The Chief of Engineers decided to build a pioneer route with engineer troops and issued the following directives: "A pioneer road is to be pushed to completion with all speed within the physical capacity of the troops. The objective is to complete the entire route at the earliest practical date to a standard sufficient only for the supply of the troops engaged on the work. Further refinements will be undertaken only if additional time is available."

Such were the original orders and under these instructions work was started. The command in the field decided the following standards, in general, would govern: Clearing, 32 ft. wide minimum; grade, 10 percent maximum; curves, 50 ft. radius minimum; surfacing, 12 ft. minimum; shoulders, 3 ft. minimum; ditch depth, 2 ft.; crown, 1 in. per ft. maximum; bridges, single-lane H-15 minimum loading.

Using the pioneer road as a base, wherever possible, and as access elsewhere, a standard highway was to be built by contractors working under the direction of the Public Roads Administration. The PRA received the following directive from the Corps of Engineers in regard to standards to be followed on its road: "To build a final type of highway according to specifications for construction of roads and bridges in national forests and national parks, 1941, issued by PRA, designated as P-41. The road to be two lanes with suitable surfacing, which can be reduced to 20 or 22 ft. if necessary. Surfacing shall be local materials with final surfacing to be applied only after drainage has been taken care of. Bridges will be trestles of local timber. Permanent bridges will be left to future financing and to the determination of the government authorities charged with operation of the road. The loading of temporary bridges shall be H-15. Trusses over 50 ft. long and trestles over 100 ft. long are to be 12 ft. wide, otherwise all bridge structures are to be 24 ft. wide. Future bridges will be designed for H-20 loading. Initial culverts will be built of local timber, permanent culverts to be of concrete or pipe. Ruling grades will be a maximum 5 percent, maximum grade will be 7 percent; curvature on prairie routes will be 3 degrees and in mountains 19 degrees, and all curves above 3 deg. will be spiraled. The sector commanders are to locate the pioneer road with above qualifications in mind for a standard final-type road in order to permit the final road to follow the pioneer route as far as practicable."

Acting under these instructions, PRA engaged four managing contractors, three American firms and one Canadian who, in turn, each negotiated contracts with nine to fourteen contracting firms. Meanwhile PRA transferred many of its engineers and other personnel to the project for making surveys and keeping records. Another contracting firm was engaged to handle all transportation of men and supplies from the States to the project.

While the army regiments arrived on the project at various intervals from March to the middle of June, none of them really got going at full speed until almost the first of

Surveying parties, location crews and the lead tractor gangs often were supplied by horse pack trains. Here is a typical pack train setting out for the head end over the army pioneer road.

July because of bad weather and floods, though some mileage was built between the April thaws and the June floods. The contractors arrived in June but they also did not get started until early July.

Early in August the Army authorities realized the progress being made on the standard highway was much too slow for completion of any kind of a road that would be of serivce this winter, and moreover that the army pioneer route would not be suitable for military traffic. Therefore, PRA was ordered to transfer some of the contractors to improving the pioneer route. These firms had equipment better suited to shaping up and surfacing the route than did the army, though the army units dropped back after they had finished their pioneer road assignment and worked along with the contractors in improving the road. The contractors were then working under a new directive as follows: "PRA operations are to be directed chiefly to the end of assisting in the completion of the pioneer road for use during the winter." Later all contractors were shifted to the army road.

Meanwhile PRA has gone ahead and surveyed a line for the final road. In general this follows the pioneer route, but in some places it does not. Just what will be done next spring has not been announced, but probably the contractors will be put back to work making further improvements as soon as possible.

Specifications under which PRA is working for the final type standard road provide a highway good for 70 mi. per hr. speed. They also call for burning of all brush, for borrowpits and gravel pits to be screened from the right-of-way by trees, and for trimmed back slopes. In short, they are specifications for the highest type of highway through scenic country, designed to handle large volumes of tourist traffic.

Whether such a road is desirable or necessary for a military supply route to Alaska is questioned by some authorities. Some PRA officials hold that even the improved army road, with its crooked alignment, cannot handle an appreciable volume of military traffic. They maintain that a high standard road is necessary to serve the military needs. These same authorities also hold that civilian travelers after the war will not be satisfied with anything less than a high standard route. However, the decision as to how to proceed next spring will depend on several factors unknown at this time, such as the ability of the present route to carry the desired military traffic adequately, the way the road stands up under the spring thaws, and the trend of the war in the Pacific.

We are building the part of the highway through Canada under a treaty with that country which calls for the United States to build the road and to maintain it for six months after the war, when it will be turned over to Canada without cost. Just what type of road we are supposed to turn over to Canada is not mentioned in the treaty.

Route of the highway

There has been much criticism of the route finally selected for the highway. In fact, the location of the route was discussed at stormy hearings of a Senate subcommittee last June. The International Commission had favored, as a peacetime route at least, a location between the Coast Range and the Rocky Mountains, running north from Prince George, B. C., to Whitehorse, Yukon Territory.

However, in 1941, the U. S. Army Air Corps in the defense of Alaska started to improve and to use a series of Canadian airports from Edmonton, Alberta, north to Ft. St. John, B. C., along the so-called prairie route east of the Rocky Mountains, thence across the Rocky Mountains in a rather open section of the country to Watson Lake and on to Whitehorse and direct to Fairbanks, Alaska.

Since part of the purpose of the Alcan Highway is to serve these airports, both as an emergency access and as means of transporting gasoline for refueling by truck instead of by valuable air cargo space, it was logical that the route follow the airports laid out the previous year. These principal airports are at Edmonton, Alberta, and Fort St. John, and Fort Nelson, B. C., Watson Lake and Whitehorse, Y. T., and Northway, Big Delta and Fairbanks, Alaska. That's the story on the final location and even the Senate subcommittee decided no further investigation was necessary.

The Alcan Highway really starts at Dawson Creek, B. C., 500 miles northwest of Edmonton. Between Edmonton and Dawson Creek is a branch line railroad, the Northern Alberta, jointly owned by the C.P.R. and C.N.R. It is a poorly-built route through muskeg and wilderness that finally ends up in the Peace River Block, a prosperous wheat-growing section in the Peace River valley. Despite inadequate motive power, light rail and operating difficulties this road has done a fine job in getting supplies and equipment through to Dawson Creek. There is a provincial highway between Edmonton and Dawson Creek but it loops around through the country even longer than the railroad does, it is only a fair-weather road entirely inadequate at present to handle any appreciable amount of traffic. The United States has no plans for a direct highway from Edmonton to Dawson Creek, but will depend upon the railroad for access to the southern terminus of the Alcan Highway.

From Dawson Creek to Ft. St. John, 52 miles, there existed a British Columbia provincial road. This has been partly relocated and improved to the PRA standard final type of road by a group of Canadian contractors under PRA direction. The Army started building its pioneer road at Fort St. John. The road between these points crosses the Kiskatinaw, or Cutbank River and the mighty Peace River, one of Canada's greatest streams.

For the first 18 miles north of Fort St. John the road follows along the west side of Charlie Lake, and then turns off to the northwest on a ridge west of the Blueberry River. Then it crosses the Beatton and the Sikanni Chief Rivers, the latter one of the major streams in this area, and continues almost due north on the east side of the Prophet River, most of the way high up on ridges and buttes. This route lies quite a bit to the west of the winter trail through the heart of the muskeg, and because of its location along the ridges much of the worst muskeg was avoided. At Fort Nelson the road drops down between the Prophet and the Fort Nelson Rivers to cross the Muskwa River, another major stream.

At Fort Nelson a short section connects with the airport, and the route turns west following the Muskwa for 50 miles or so to Steamboat Mountain, first of the foothills of the Rocky Mountains. From Fort St. John to this point the road traverses a rolling, heavily forested country. At Steam-

Guiding the Alcan Highway

Thomas H. MacDonald, commissioner, and J. S. Bright, engineer in charge for Public Roads Administration, ready to inspect the project.

Assistant Chief of Engineers, Brig.-Gen. C. L. Sturdevant in charge of all engineer troops visits the highway.

CANADIAN PACIFIC AIRLINES
ADIAN PACIFIC

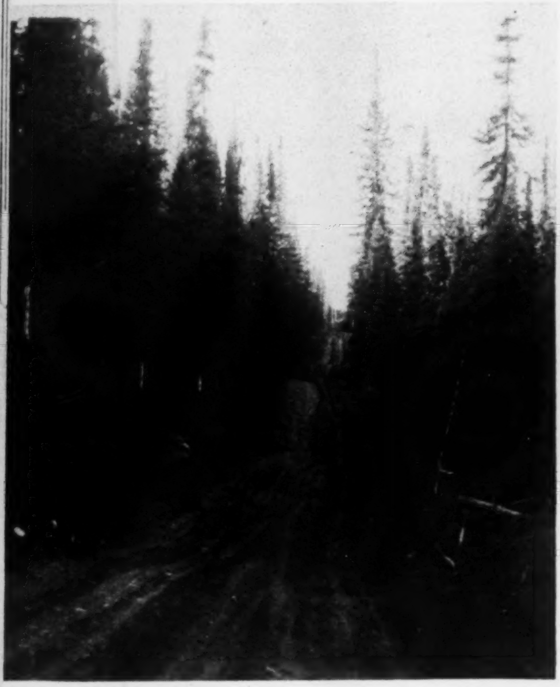
Brig.-Gen. Wm. M. Hoge, director of the project in its early stages before leaving on another big war assignment.

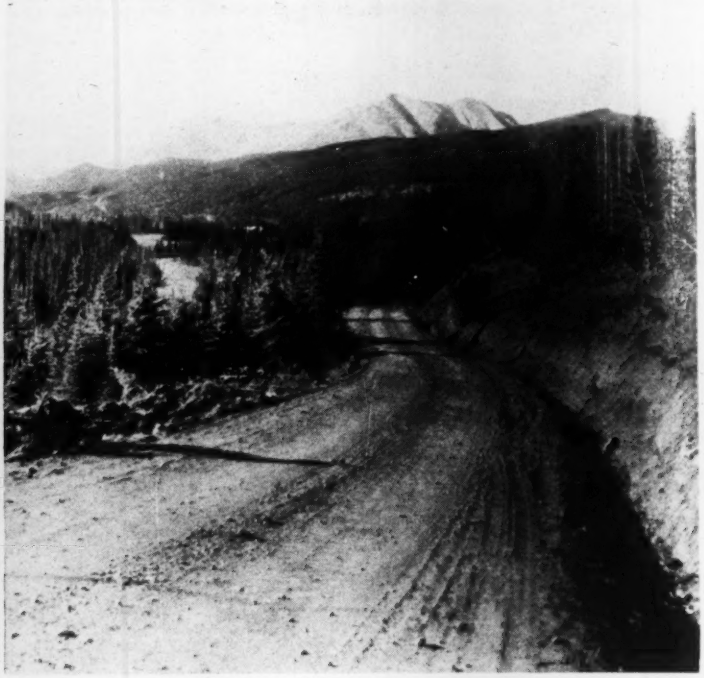
Maj.-Gen. Eugene Reybold, Chief of Engineers, heads the army roadbuilders.

Brig.-Gen. James A. O'Connor, head of the Northwest Service Command and boss of the road.

Alaska's Governor Ernest H. Gruening discusses the highway with Col. John W. Wheeler, army engineer in direct charge of building the road.

NEWS-RECORD CAMERA SHOTS

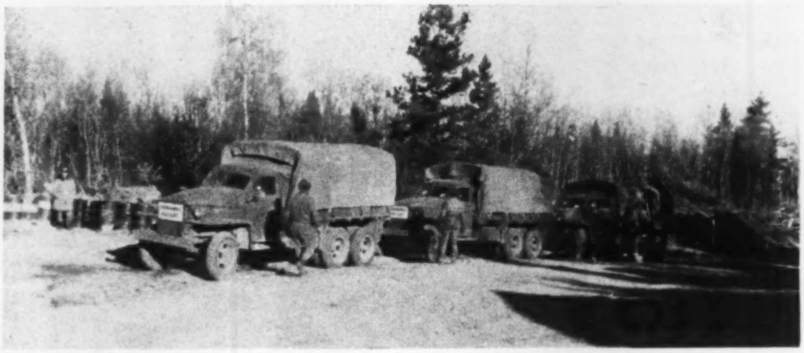




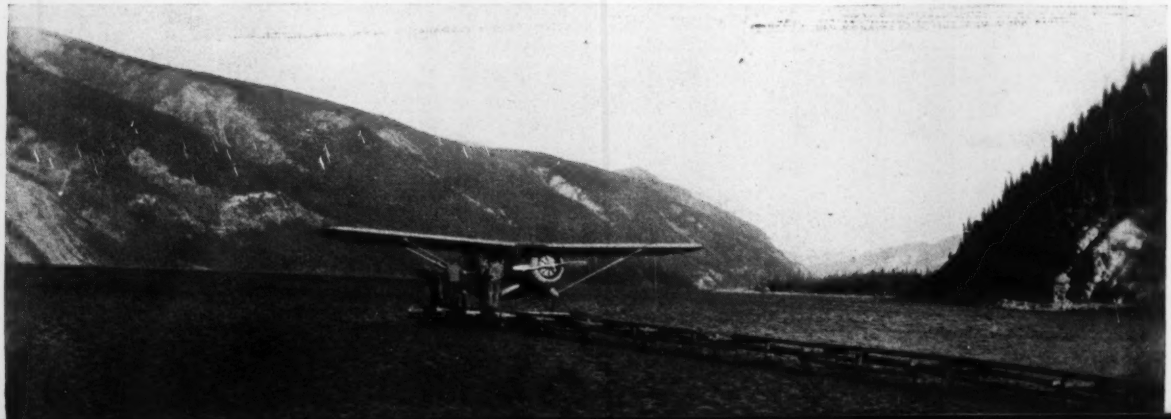
Pioneer road through heavy-forested section of British Columbia prior to any improvements. From trails like this roads as shown to the right were built.

Typical of the improved army road is this section in the upper Tetsa River Valley in British Columbia, looking toward Summit Lake pass through the Rockies. Summit Lake, El. 4212, is the highest point on the Alcan Highway.

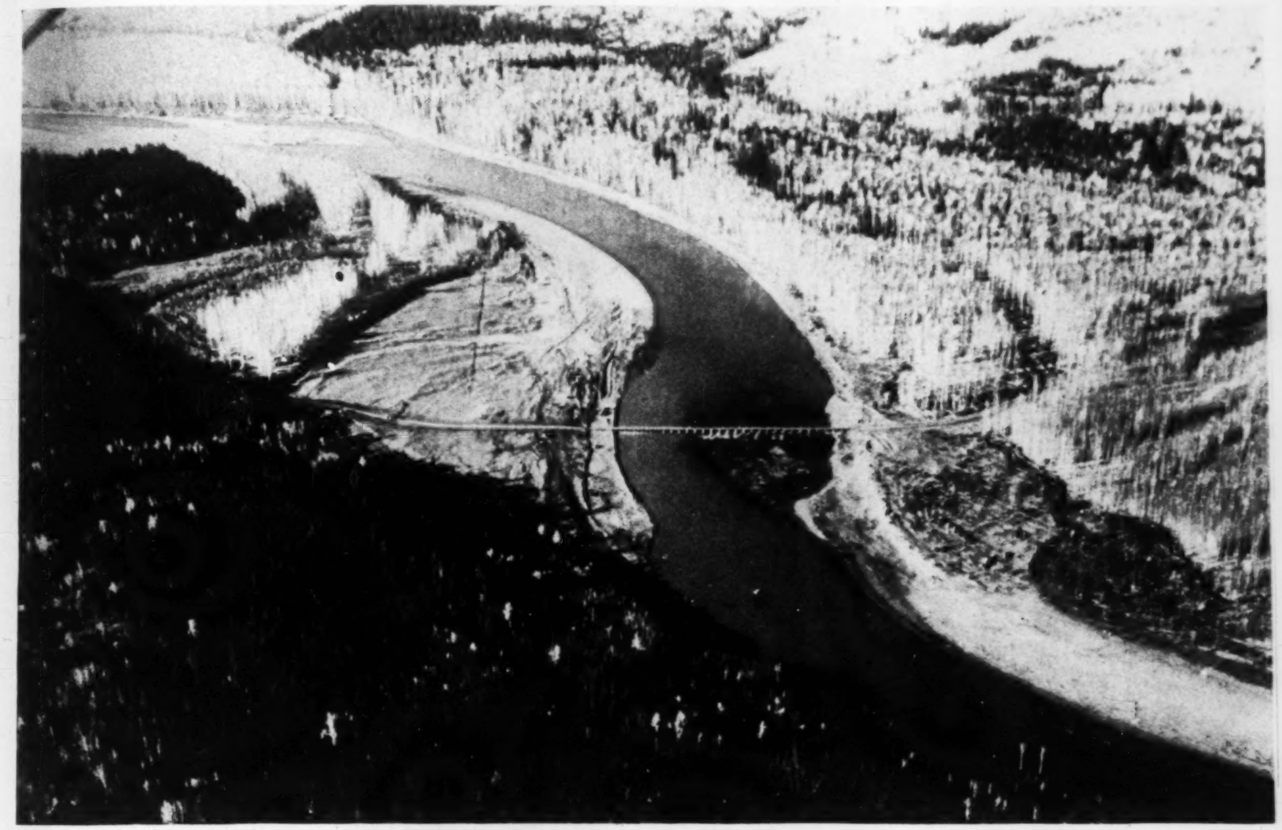
Fairbanks Freight, through trucks enroute from Dawson Creek, signify that the road is open to the military traffic for which it was built.



For aerial reconnaissance, communication, transportation of men and supplies, small "bush-hopper" planes like this were indispensible in building the highway through the wilderness. Here is a pontoon equipped ship landing at Muncho Lake.



ALONG THE ALCAN HIGHWAY

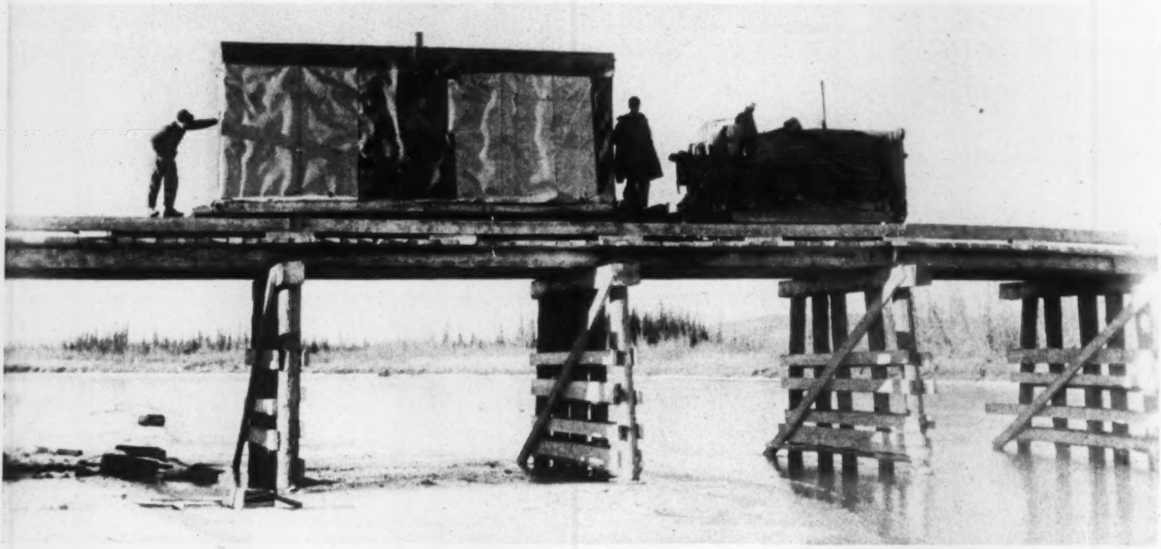


Waterways from swift mountain torrents to broad rivers had to be crossed. This temporary structure across the Muskwa near Ft. Nelson is a combination of timber cribs and pile trestle.

Supply problems were many and varied. At Skagway barges from the States were beached at low tide, unloaded from dry ground.

Roadbuilding could not wait for bridge building, so crude ferries were rigged up for transporting men and equipment across waters too deep to ford. Two big diesel tractors, piloted by negro soldiers, complete a trip over Nisutlin Bay in the Yukon.

NEWS-RECORD CAMERA SHOTS



A bunkhouse takes a ride across the Tanana River. Several contractors found shacks mounted on log skids preferable to tent camps, so moving day called for tractors instead of trucks. Note the Yukon Heater on the tractor, a canvas enclosing the engine and lower part of the driver. This is also a good view of temporary bridge construction.

Camp life lacked all the comforts of home. This bewhiskered construction worker is washing his woolies with a scrubbing brush. The empty oil drum furnished the hot water. Construction camps, both army and contractor, were primitive, with a modern touch supplied by portable light plants. Recreation facilities were woefully lacking.

Keeping equipment rolling was the most difficult job of all. Spare parts could not be obtained, repair facilities were crude at best. Here a contractor near Whitehorse has rigged up a couple of tents for field repair shops.

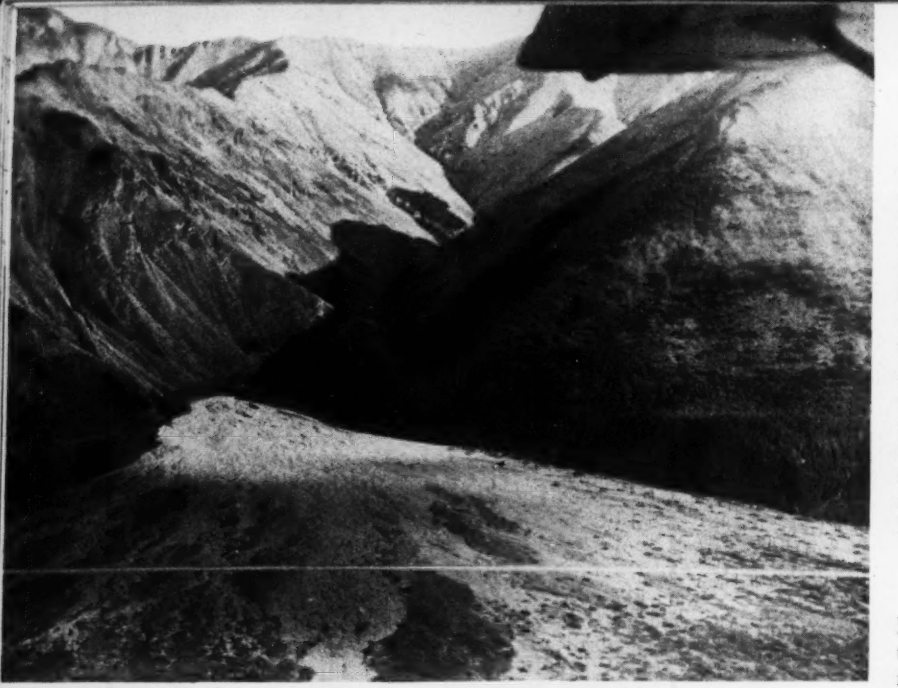
ALONG THE ALCAN HIGHWAY

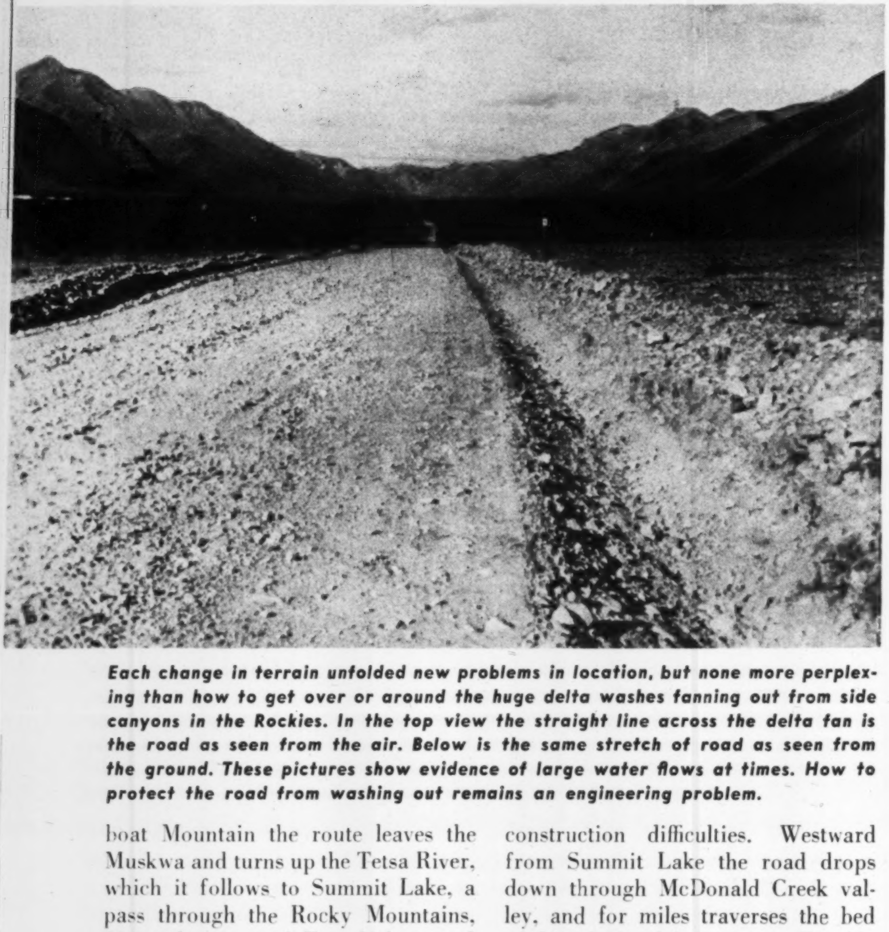
Spreading cleared brush and trees over undisturbed topsoil as an insulation mat prior to placing fill was found the best way to build roads over perpetually-frozen ground in the Yukon.

Blasting a shelf along the 3-mile shore of Muncho Lake was the heaviest rock work on the whole highway. Meanwhile a temporary route took over the cliffs on a 35-percent grade.

Emergency repairs on the road kept equipment in service. This roadside scene of an army crew working on a broken tractor track with portable welding and repair outfits was repeated time after time along the highway. Lack of spare parts was partly offset by the ingenuity of mechanics in making repairs with materials on hand.

Strange conveyances were utilized for transportation of men and supplies at the head end. Tractor-drawn track wagons, as shown here, were but one of the ingenious methods developed. Sometimes sleds dragged through the mud replaced the wagons.





Each change in terrain unfolded new problems in location, but none more perplexing than how to get over or around the huge delta washes fanning out from side canyons in the Rockies. In the top view the straight line across the delta fan is the road as seen from the air. Below is the same stretch of road as seen from the ground. These pictures show evidence of large water flows at times. How to protect the road from washing out remains an engineering problem.

boat Mountain the route leaves the Muskwa and turns up the Tetsa River, which it follows to Summit Lake, a pass through the Rocky Mountains, 102 miles west of Fort Nelson and 419 miles from Dawson Creek. Summit Lake is at El. 4,212, the highest point on the entire Alcan Highway.

The route on the east slope of the Rockies traverses some rough country but none offering very serious construction difficulties. Westward from Summit Lake the road drops down through McDonald Creek valley, and for miles traverses the bed of this glacier debris stream. Trouble may be experienced here next spring if the water gets very high. After leaving McDonald Creek the road cuts over a low divide into Racing River valley, and now crosses that river on a long trestle, though the original trail route went upstream 3 miles to cross on a short bridge over a narrow spectacular gorge. From the Racing River the route extends westward into the Toad River valley and follows this stream all the way up to Muncho Lake, one of the most beautiful spots on the highway. The Toad River traverses a deep canyon for most of its length, and along this part of the route and along Muncho Lake some of the most difficult construction was encountered. Muncho Lake is 172 miles west of Fort Nelson, and resembles one of the lakes in Glacier National Park in its setting.

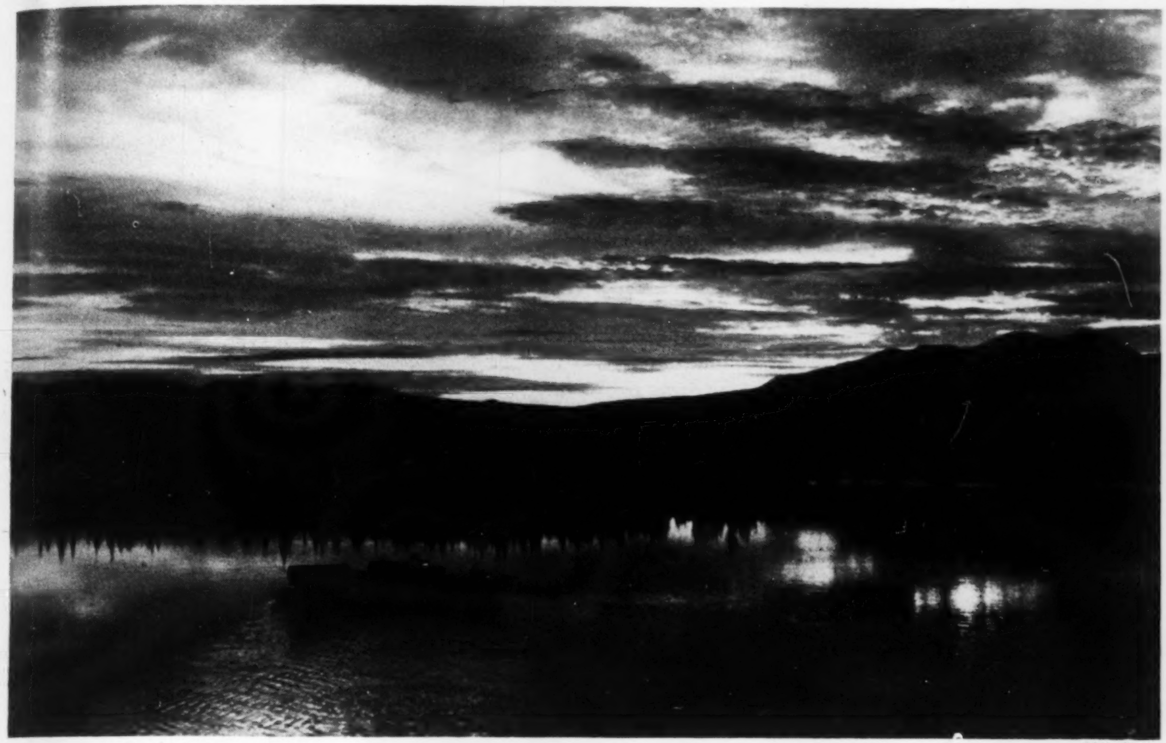
West from the Rockies

Dropping down from Muncho Lake the road follows the Trout River to its junction with the Liard, 209 miles west of Fort Nelson. The Liard is another one of the great rivers of the North and the road crosses to the north side of this stream on a long trestle just above the junction of the Trout. By this time the road has left the mountains and for the next 150 miles follows westward along the north bank of the Liard through heavily forested country, crossing three main tributaries of the Liard—the Smith, the Coal, and the Hyland.

At Watson Lake, 662 miles from Dawson Creek, an 8-mile connection leads to the airport. The road continues on west, soon crossing the Liard again, but this time on a much shorter bridge than down below. After crossing rolling country full of swamps and lakes, the road finally gets over into the Rancheria Valley, following up this stream almost to its source.

At the upper end of the Rancheria, 88 miles west of Watson Lake, the road crosses a low divide between the MacKenzie and Yukon drainage areas and follows down the Swift and Morley rivers to Teslin Lake through a wet, swampy section that caused some trouble. Crossing Nisutlin Bay on a 2,000-ft. trestle the road continues northwestward along Teslin Lake, then crosses the Teslin River to the Lewes River, a branch of the Yukon. Beyond Tagish Lake, at a point known as Jakes Corner, a branch takes off to the town of Carcross, while the main road continues northwest to Whitehorse, the principal city of Yukon Territory.

Whitehorse is also the interior terminus of the White Pass & Yukon Railroad, a narrow-gage route run-



PRA Photo

Sunset on beautiful Kluane Lake in the Yukon finds a squad of PRA engineers returning to base camp from a surveying trip.

Soldier's Summit at Kluane Lake, site of the official dedication ceremonies opening the highway on Nov. 20.

Wild life abounds in the Northern wilderness. Roadbuilders met many bear and moose; game supplemented camp fare.

Chilly evidence of the permanently frozen ground in the Yukon. Ice is just below the surface.

PRA Photo

Washday in a primitive surveyor's camp far out in front of the road. Note the head nets for protection against mosquitoes.

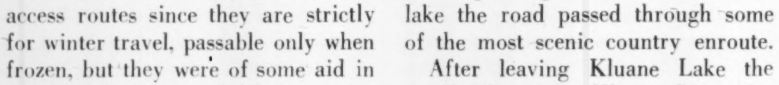
ning 111 miles from Skagway, Alaska, at the head of the Inside Passage on the coast. From Whitehorse westward for about 150 miles the road follows the Takhini and the Dezadeash River valleys along old trails established in the days of '98. These trails were not much use as access routes since they are strictly for winter travel, passable only when frozen, but they were of some aid in locating the route. Only one major stream is crossed in this section, the Takhini. At the little Indian village of Kluane, 147 miles west of Whitehorse, the road strikes beautiful Kluane Lake, 45 miles long, nestling at the base of the foothills of the St. Elias range of mountains. Skirting along the west side of the lake the road passed through some of the most scenic country enroute.

After leaving Kluane Lake the road follows the Kluane River for some distance and then takes off through the foothills, crossing the Donjek and White Rivers, both wide glacial debris streams heading up in the St. Elias Mountains. From the White crossing the route swings north through low-lying hills, crossing many small streams, striking the Alaska-Yukon border 325 miles west of Whitehorse.

Road splits in Alaska

On entering Alaska the route follows the north side of the Tanana Valley for 100 miles, crossing this river just below the junction of the Tok River which comes in from the south. From this junction the main road runs another hundred miles west to Big Delta, the terminus of the Alcan Highway, 1,582 miles from Dawson Creek. Here the new road meets the Richardson Highway running between Valdez, on the coast, and Fairbanks in the interior. It is 88 miles from Big Delta to Fairbanks, and this section of the Richardson Highway has been improved considerably by the Alaska Road Commission this past summer.

At the junction of the Tok and Tanana Rivers another branch of the Alcan Highway swings south, following up the Tok Valley through the Nutzotin Mountains and the Wrangell Range, dropping down through the Slana River valley to the village of Slana. Here the road technically ends, 72 miles from the Tok junc-



The Alcan battlefront took its toll of life. This monument on Kluane River is a tribute to Lt. Roland Small, formerly a construction engineer for P. T. Cox in New York.

Rivers had to be crossed long before the bridge building crews arrived. Deep streams called for pontoon ferries, but all shallow waters were forded by the equipment. Here a party of officers cross Yukon's Rancheria River aboard a tractor.

Mud and treacherous side ditches on the pioneer road caused lots of grief. Here a trailer and its shovel load take a spill.

"Cat skinners" from opposing regiments relax as their bulldozers meet to close last gap in the pioneer road.

No customs officers bothered this first bulldozer crew to cross the international boundary between Alaska and the Yukon. Jovial at beating the oncoming white regiment to the border, the negro troops set up a signpost "Los Angeles City Limits".

tion. However, for another 64 miles to Gulkana, where the main line of the Richardson Highway is met, the contractors improved most of this branch road. Gulkana is 131 miles from Valdez.

The Alaska Road Commission has just completed a 200-mile link between Gulkana and Palmer, serving Anchorage, so it is now possible to travel by road from Dawson Creek to Anchorage.

Another section of road is being surveyed between Haines, on the coast, to Champagne on the Alcan Highway, 65 mi. west of Whitehorse to relieve the load on the W. P. & Y. R. R. This stub link, 165 miles long, will cut through Chilkat Pass, following one of the trails of '98. A winter trail is now under construction which will be improved into a road next spring.

Route from aerial surveys

The route, traversing great stretches of unmapped and unchartered wilderness was, for the most part, selected by aerial reconnaissance. In some places it follows old Indian and trapper trails, and in the western Yukon old trails of the '98 gold rush were utilized as the basis of locations for some stretches.

Late in March parties of PRA engineers made reconnaissances by dog sled, one investigating the proposed route from the Sikanni Chief River north to Fort Nelson, the other working west from Fort Nelson through the Summit Lake Pass to Muncho Lake. These ground trips collaborated air trips by Army officers. For some time the Army was inclined to continue north from Fort Nelson, following the Fort Nelson River valley to the Liard, thence west on the north side of the Liard Valley to Watson Lake through open country. Subsequent investigation showed this proposed route might be wet and swampy for great distances, so the final location was shifted into the mountains to the south, through the Summit Lake Pass and past Muncho Lake, thence down the Trout to the Liard.

From what few maps were available for the north British Columbia and Southern Yukon areas, and from popular belief, the Army thought there were several definite mountain ranges running generally north and south, that must be crossed. In fact, the maps indicated a high range between Watson Lake and Whitehorse with passes at elevations from 6,000 to 7,000 ft. The Army was told it would have to swing south from Watson Lake up the Dease River and come into Whitehorse through the Lake Atlin country, lengthening the route by 500 miles. Actually, the mountains are not in long ranges up there, but rather are arranged in groups separated by low-lying areas and broad valleys. Aerial inspection revealed the possibilities of the Rancheria and Swift River valleys. The line, as finally located west of Watson Lake, crosses the low divide between the Rancheria and Swift Rivers (MacKenzie and Yukon drainage areas) at an elevation of 3,500 ft. Throughout its entire length the highway never drops below El. 2,000, and traverses the country at an average elevation of 2,500.

Thus, the Alcan roadbuilders proved three questioned points: the road could be built along the route desired; it crossed the mountains at much lower altitude than critics believed possible; and it was completed as a suitable truck route in one short season, in time to be of military service this winter.

Subsequent articles

The next article will tell of the problems of supply, how equipment, materials and supplies were gotten into the wilderness and distributed throughout the project. It will also tell of living and working conditions, of the road camps and headquarters, and of the difficult equipment, repair and maintenance problems. The third and final article in this series will describe the construction tactics, how the various regiments were filtered into various points for effective attack, and how the PRA and contractors organized and distributed their forces. A list of key personnel and contractors also will be included.

Smashing its way through a white poplar forest comes the lead bulldozer, forerunner of Alcan road building.

CONTRACT•UNIT PRICES

What contractors are bidding on different kinds of construction work

WATER SUPPLY SYSTEM, SCHENECTADY, N. Y.

OWNER: City of Schenectady, Department of Water; John H. Burwell, Chief Engineer. Malcolm Pirnie, New York, N. Y., Consulting Engineer.

PROJECT: Construction of water supply system (Contracts 2, 3, 4 and 5) located west of Schenectady, N. Y., on the west side of the Mohawk River and the old Erie Canal, about 1,500 feet south of existing pumping station of the City. Contract No. 2—Structures, Equipment and Piping—includes excavation, concrete masonry, cast iron piping, Venturi meters, chlorine and ammonia equipment, pumping equipment, cement asbestos piping, road surfacing, grading and grassing, brick work and miscellaneous work necessary for construction of control building, and about nine well houses and connecting pipe lines. Contract No. 3—Electrical Work—includes outdoor substation; conduits and wiring between the station, wells and control building; motor control equipment; lighting; and exhaust fans in each well house. Contracts No. 4 and 5—Plumbing and Heating—are for furnishing and installing small service water piping inside and outside of buildings; fixtures; drains; connecting piping in administration building; and furnishing coal-fired heating system.

CONDITIONS: Contractor to furnish all materials and complete work in 300 calendar days. Rail, highway and water transportation facilities available. Wage rates are: skilled labor, $1.00 to $1.70 per hour; semi-skilled, 75c. to $1.25; and common, 75c to 85c.

BIDS: Four bids were received on Contract 2 October 28, 1942; three on Contract 3; and two each on Contracts 4 and 5. All bidders and amounts of bids are shown in tabulation below.

Contract No. 2—Structures, Equipment and Piping

LIST OF BIDDERS:

1. Stock Construction Corp., New York, N. Y. (contract)	$208,928
2. Turbine Equipment Co., Inc., New York, N. Y.	280,379
3. Thomas C. Brown Co., Inc., Schenectady, N. Y.	295,070
4. Maguire & Dugan, Inc., Brooklyn, N. Y.	298,233

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation	9,600 c. y.	$0.60	$1.18	$2.52
2. Class A concrete	1,600 c. y.	22.00	30.90	33.00
3. Class B concrete	350 c. y.	10.00	25.75	22.00
4. Steel reinforcing	120,000 lb.	.05	.067	.076
5. B. & S. cast iron pipe	150 ton	110.00	96.60	97.00
6. B. & S. cast iron pipe fittings	30 ton	210.00	219.65	202.00
6a. Flanged cast iron pipe	2 ton	150.00	264.50	188.00
6b. Flanged cast iron fittings	50 ton	285.00	281.75	260.00
7. 24-in. gate valve	9 ea.	800.00	803.00	1,150.00
8. 18-in. gate valve	1 ea.	400.00	356.00	587.00
9. 14-in. gate valve	9 ea.	225.00	211.00	400.00
10. 8-in. gate valve (hub ends)	1 ea.	70.00	69.00	84.00
11. 8-in. gate valve (flanged ends)	1 ea.	60.00	57.50	79.00
12. 6-in. gate valve (hub ends)	1 ea.	50.00	46.00	62.00
13. 6-in. gate valve (flanged ends)	1 ea.	40.00	34.50	57.00
14. 4-in. gate valve	1 ea.	30.00	22.00	42.00
15. 4-in. gate valve (extension stem)	2 ea.	35.00	34.50	48.00
16. 3-in. gate valve	5 ea.	25.00	17.50	31.00
17. 2½-in. gate valve	9 ea.	20.00	14.00	21.00
18. 2-in. gate valve	7 ea.	15.00	11.00	16.00
19. 2-in. gate valve (extension stem)	2 ea.	25.00	23.00	24.00
20. 18-in. check valve	1 ea.	525.00	517.00	613.00
21. 14-in. check valve	8 ea.	350.00	300.00	380.00
22. 3-in. check valve	2 ea.	20.00	11.50	23.00
23. 2-in. check valve	2 ea.	15.00	9.00	14.00
24. 6-in. flap valve	9 ea.	30.00	44.00	40.00
25. 6-in. pressure reducing valve	1 ea.	225.00	230.00	245.00
26. 4-in. pressure reducing valve	1 ea.	160.00	161.00	179.00
27. 6-in. pressure relief valve	9 ea.	220.00	205.00	250.00
28. 2½-in. air and vacuum relief valve	9 ea.	110.00	92.00	105.00
29. 1-in. air relief valve	5 ea.	35.00	30.00	36.00
30. ½-in. air relief valve	9 ea.	12.00	23.00	12.00
31. 6-in. hydrant	3 ea.	150.00	143.00	185.00
32. Miscellaneous iron and steel work	10,000 lb.	.05	.26	.1916
33. Venturi meters	Lump Sum	7,000.00	8,720.00	7,600.00
34. Connections to existing mains	Lump Sum	4,000.00	4,100.00	1,922.00
35. 4-in. cement asbestos pipe	1,000 l. f.	1.00	.60	.854
36. 6-in. cement asbestos pipe	1,500 l. f.	1.30	.96	1.20
37. Chlorine and ammonia equipment	Lump Sum	12,500.00	15,180.00	14,829.00
38. High service units (well pumping equipment)	8 ea.	5,000.00	4,798.00	5,330.00
39. Low service units (well pumping equipment)	1 ea.	6,000.00	5,866.00	6,782.00
40. Road surfacing	3,200 s. y.	1.80	1.30	4.50
41. Concrete drain pipe	225 l. f.	2.00	1.20	1.40
42. Grading and grassing	8 ac.	200.00	309.00	470.00
43. Drain and sewage pumps	Lump Sum	2,200.00	2,600.00	2,824.00
44. Superstructures	Lump Sum	20,000.00	63,150.00	43,620.00

Contract No. 3—Electrical Work

LIST OF BIDDERS:

1. M. Gold & Son, Schenectady, N. Y. (contract)	$79,500
2. Turbine Equipment Co., Inc., New York, N. Y.	81,610
3. Utility Electric Co., Inc., New York, N. Y.	109,625

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Electrical work	Lump Sum	$79,500.00	$81,610.00	$109,625.00

Contract No. 4—Plumbing

LIST OF BIDDERS:

1. Thomas C. Brown Co., Inc., Schenectady, N. Y. (contract)	$3,560.00
2. Turbine Equipment Co., Inc., New York, N. Y.	5,260.00

Item	Quan.	Unit Prices (1)	(2)
1. Plumbing	Lump Sum	$3,560.00	$5,260.00

Contract No. 5—Heating

LIST OF BIDDERS:

1. Thomas C. Brown Co., Inc., Schenectady, N. Y. (contract)	$2,880.00
2. Turbine Equipment Co., Inc., New York, N. Y.	3,975.00

Item	Quan.	Unit Prices (1)	(2)
1. Heating	Lump Sum	$2,880.00	$3,975.00

SANITARY SEWER, MISSOURI

OWNER: City of Kansas City, Mo.; Department of Public Works.

PROJECT: Construction of sanitary sewer (extension of Blue River Sewer) approximately two miles long, from 91st St. and Woodland Ave., to 79th and Cleveland Aves., Kansas City, Mo. Sewer 42-in. diameter for 6,500 feet of length, and 24-in. diameter for balance.

CONDITIONS: Contractor to furnish all materials and complete work in 90 days. Highway transportation facilities available to site of work. Wage rates are: skilled labor, $1.50 to $1.65 per hour; and common labor, 55 to 90c.

LIST OF BIDDERS: (Bids opened October 27, 1942.)

1. General Contracting Co., Inc., Kansas City, Mo. (low bid)	$189,741
2. J. A. Tobin Constr. Co., Kansas City, Mo. (contract)	202,356
3. Bowen Constr. Co., Kansas City, Mo.	211,278
4. H. A. Williams & Co., Kansas City, Mo.	244,029

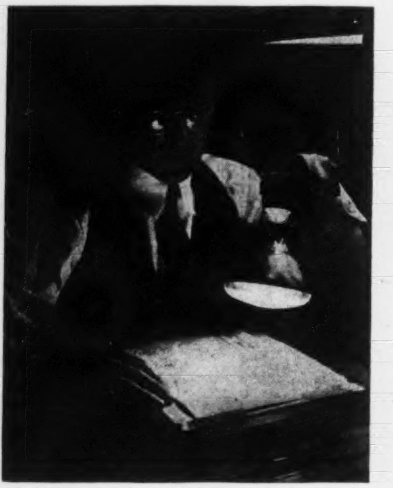
Item	Quan.	Unit Prices (1)	(2)	(3)
1. 24-in. rein. concrete pipe, trench	2,070 l. f.	$10.00	$12.00	$15.00
2. 24-in. rein. conc. pipe, on trestle	928 l. f.	4.00	4.25	4.00
3. 24-in. ext. str. conc. pipe, tunnel	652 l. f.	30.00	30.00	75.00
4. 42-in. rein. conc. pipe, in trench	6,128 l. f.	15.00	14.75	10.00
5. 42-in. rein. conc. pipe, trestle	352 l. f.	7.00	9.10	8.00
6. Reinforced concrete, trestles	315 c. y.	50.00	75.00	75.00
7. Plain. conc. in cradle and ditch drain	820 c. y.	22.00	19.00	20.00
8. Base rock	440 c. y.	5.00	2.75	10.00
9. Load bearing timber piling	2,800 l. f.	2.75	2.50	3.00
10. 6-in. farm drain tile	630 l. f.	1.50	.85	1.50
11. Manholes	23 ea.	150.00	365.00	250.00
12. Junction chamber	1 ea.	500.00	575.00	500.00
13. Support for 3 tracks near Sta. 46	Lump Sum	2,800.00	3,500.00	3,500.00

New Aids to the Constructor

Equipment and material announcements and manufacturers' news

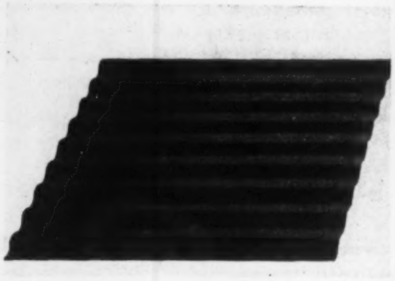
Speeds Drafting

A draftsman in the patent department at the Westinghouse Lamp Division is shown using a 250 watt R-40 bulb reflector drying lamp to speed his job, just as lamps of the same type are saving time in many production operations in industry. After tracing over a pencil drawing with ink, the draftsman turns the infra-red lamp on the drawing for about a minute. This takes all the moisture out of the ink and paper so that after the pencil marks are erased, the ink lines remain sharp and black. Use of the lamp eliminates necessity of retracing the ink lines to eliminate effect produced by erasure.—*Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.*



Corrugated Asphalt Siding

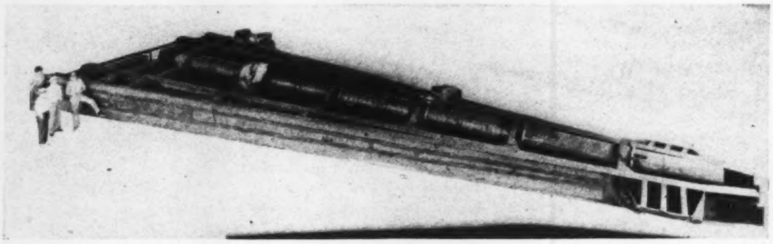
Rags and resin have been combined into a war emergency building material substitute for corrugated steel sheets. Called corrugated asphalt siding, the new product has recently been placed on the market by the Celotex Corp. The product is designed for wartime application on industrial, commercial and farm buildings. It can replace corrugated steel sheets used for covering outside walls of temporary structures of all kinds, including factory buildings, warehouses, storage and machine sheds, dairy barns and drying sheds. The siding consists of two sheets of heavy felt saturated with a resino-bituminous compound. The sheets are bound together with a high melting-point asphalt adhesive and corrugated under high pressure. Finished sheets are said to be hard, rigid, light in weight and moisture-proof. No critical raw materials are required, according to the manufacturers. The life of corrugated asphalt siding can be prolonged indefinitely by coating or painting immediately after application and every few years thereafter.—*The Celotex Corp., 120 S. LaSalle St., Chicago, Ill.*



Two Pen Flow Recorders

Where panel space is at a premium, or where it is desired to have two related

(*Continued on p.* 110)



Dredge Ladder

The illustration above shows a 35 ton dredge ladder, which was built entirely by arc welding. Due to the shortage of shapes, its 70 ft. side beams had to be split and made to size with welded plates. Perfect alignment it is claimed was achieved by skip welding. All joints in the entire structure were "Vee" joints. The equipment used was six Hobart electric driven arc welders, and the job was constructed at the Converse Bridge & Steel Co., Chattanooga, Tenn., under the direction of R. P. Smith, superintendent.—*Hobart Brothers Co., Troy, Ohio.*

Here Is Your Nearest Worthington Distributor

For Sales, Rentals and Service on BLUE BRUTE Portable Compressors, Rock Drills and Air Tools. Get your EQUIPMENT-SAVER — FREE

see full page ad page 101

ALABAMA
  Birmingham — Ed Gantt Machinery Company
ARIZONA
  Phoenix — Smith Booth Usher Company
ARKANSAS—Fort Smith — R. A. Young & Son
  Little Rock — R. A. Young & Son
CALIFORNIA
  Los Angeles — Smith Booth Usher Company
COLORADO
  Boulder — Standard Machine Works
CONNECTICUT
  Hartford — The Holmes-Talcott Company
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  Rock Island — Western Equipment & Supply Co.
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MISSOURI
  Kansas City — Machinery & Supplies Company
  St. Louis — Webster & Hedgcock Tr. & Eq. Co.
MONTANA—Helena — Caird Engineering Works
NEW JERSEY
  Irvington — Smith Tractor & Equip. Co., Inc.
NEW MEXICO
  Albuquerque — The Harry Cornelius Company
NEW YORK
  Albany — Larkin Equipment Company
  Binghamton — MacDougall Equipment Co.
  Buffalo — Dow & Company, Inc.
  Corona, L. I. — The Jaeger-Lembo Machine Corp.
  Middleton — S. T. Randall, Inc.
  New York—Hubbard & Floyd, Inc.
  Olean — Freeborn Equipment Company
  Oneonta — L. P. Butts, Inc.
  Syracuse — Harrod Equipment Company
NORTH CAROLINA
  Durham — Constructors Supply Company, Inc.
OHIO — Cincinnati — The Finn Equipment Company
  Cleveland — Gibson-Stewart Company
  Marietta — Northwest Supply & Equipment Co.
  Toledo — M. W. Kilcorse & Company
OKLAHOMA
  Oklahoma City — Townsco Equipment Co.
OREGON
  Portland — Andrews Equipment Service
PENNSYLVANIA
  Easton — Sears & Bowers
  Harrisburg — N. A. Coulter
  Oil City — Freeborn Equipment Company
  Philadelphia — Metalweld, Inc.
  Pittsburgh — John McC. Latimer Company
  Wilkes-Barre — Ensminger & Company
SOUTH CAROLINA
  Columbia — Bell-Lott Road Machinery Co.
SOUTH DAKOTA
  Sioux Falls — Empire Equipment Co.
TENNESSEE
  Chattanooga — James Supply Company
  Knoxville—Wilson-Weesner-Wilkinson Co.
  Memphis — Tri-State Equipment Company
TEXAS — Dallas — Shaw Equipment Company
  Houston — McCall Tractor & Equipment Co.
  San Antonio — Patten Machinery Company
VIRGINIA
  Richmond — Highway Machinery & Supply Co.
WASHINGTON
  Seattle — Star Machinery Company
WEST VIRGINIA
  Fairmont — Interstate Engineers & Constructors
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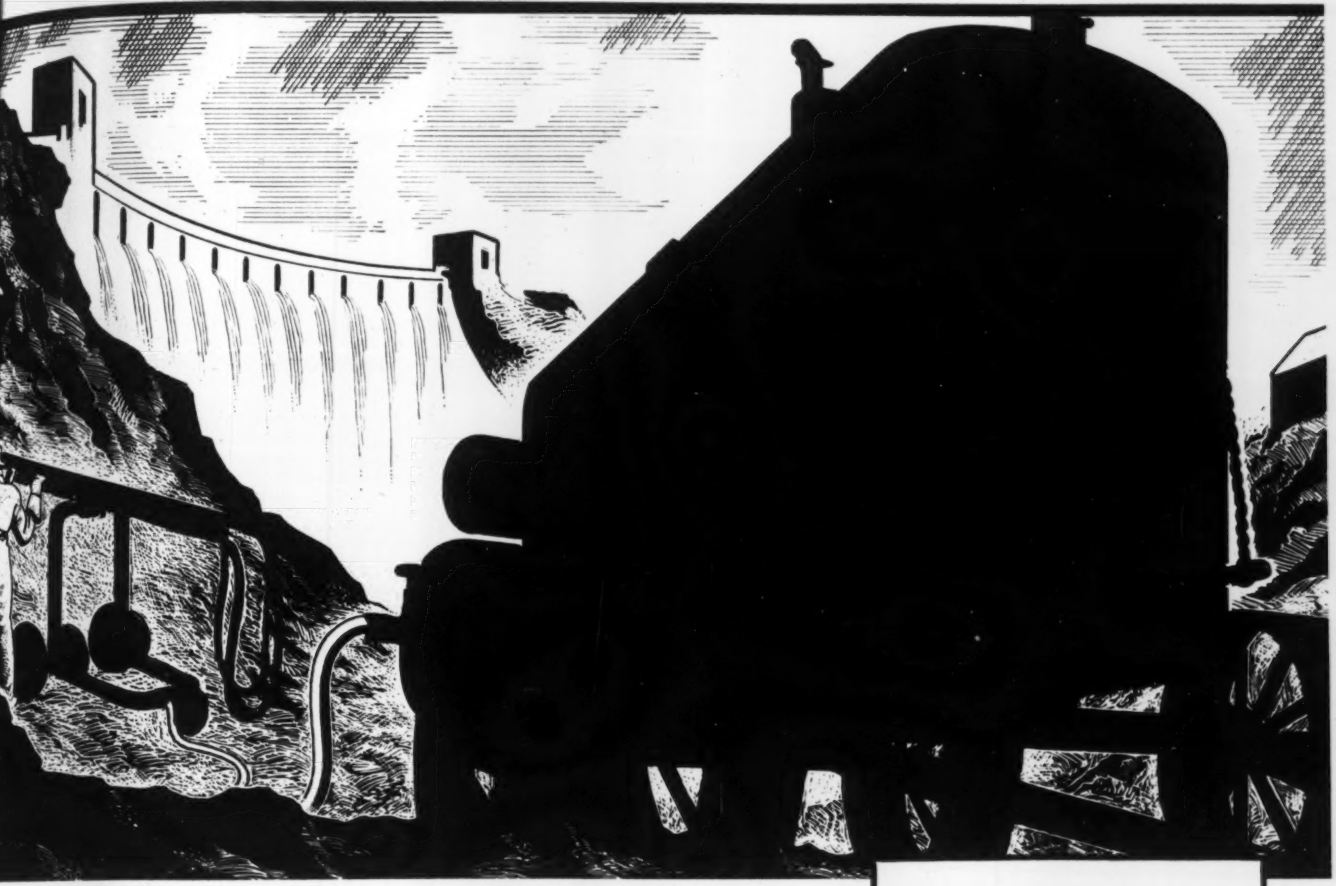
  Green Bay — Nelson Machinery Company
  Madison — Western Equipment Company
WYOMING
  Cheyenne — Wilson Equipment & Supply Co.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Worthington Pump and Machinery Corp.

BRUTE LUNGS, BUT NO BACK-TALK . . .



Look into the vitals of this Worthington Blue Brute Compressor and get a new angle on lung-power! All muscle, you'll say, and plenty of it. Then start it up and listen to the way it breathes!

You'll find that this Brute's smooth delivery through Worthington Feather* Valves will get your next job done more quickly, more safely, more economically—without the air-gulping "back-talk" and whining of lesser breeds.

All Worthington Blue Brutes *save air*. Blue Brute Compressors . . . portable and semi-portable, gasoline-driven, diesel or electric . . . *deliver more air* for every power-dollar you spend. And Blue Brute Air Tools *use less air* for every compression-dollar invested.

Now's the time to investigate those Blue Brute features that give you *extra* lung-power, *extra* stamina — over and above the rock-bottom fact of Blue Brutes' tip-top quality.

FREE EQUIPMENT-SAVER SPEEDS VICTORY

Save tools, time and money, by getting Worthington's new EQUIPMENT-SAVER, *complete instructions* for all tool operators. Your nearest Worthington distributor, listed on page 100, will supply you. If there is none near you, write for it direct to Holyoke.

On the Job with

BLUE BRUTES

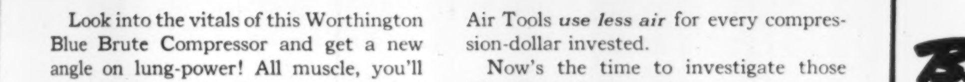
A western construction man writes: "Have sent in order for some spare parts but I think that I won't have to use them. All three BLUE BRUTE compressors that I have do not give one minute's trouble and operate as perfectly as they did when they first came on this job."

---

* Reg. U. S. Pat. Off.

Get more WORTH *from air with* WORTHINGTON

BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Harrison, N. J. Holyoke Compressor and Air Tool Department, Holyoke, Massachusetts

TARPAULINS
Shipped Immediately
NO PRIORITIES NECESSARY*

Now you can phone any of the Distributors listed at the right—order any of the tarpaulins in sizes and brands listed below—and, unless there has been an unusual demand for the particular item you specify—YOUR ORDER WILL BE SHIPPED IMMEDIATELY...

* This fortunate condition is due to the fact that a large stock of tarpaulins has been made up from released goods and is awaiting your call.

BEAVER BRAND EXTRA

7.50 OZ. BEFORE WATERPROOFING
16 OZ. AFTER WATERPROOFING

STOCK SIZES

6 x 8	12 x 14
8 x 10	15 x 20
10 x 12	20 x 20

DEERSKIN BRAND EXTRA

10 OZ. BEFORE WATERPROOFING
18 OZ. AFTER WATERPROOFING

STOCK SIZES

8 x 10	12 x 14
10 x 12	12 x 18
10 x 14	15 x 20
10 x 16	20 x 20

MULEHIDE BRAND EXTRA

12 OZ. BEFORE WATERPROOFING
20 OZ. AFTER WATERPROOFING

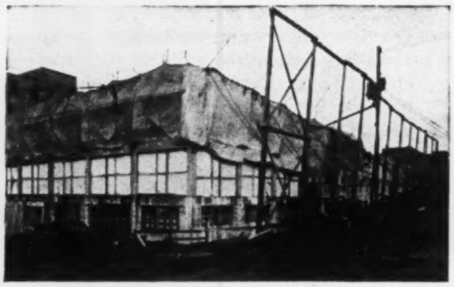
STOCK SIZES

12 x 16	
14 x 16	18 x 24
15 x 20	20 x 20

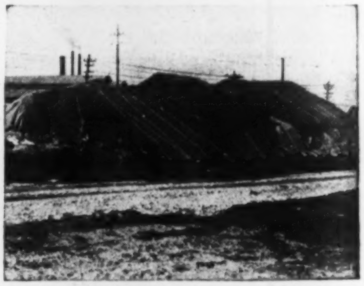
ALL THE ABOVE BRANDS TREATED WITH GENUINE PARA WATERPROOFING

NATIONALLY STOCKED FOR IMMEDIATE SHIPMENT

For floor-by-floor protection on jobs like this, tarpaulins keep cold out, heat in.



For over-all protection, tarpaulins may be suspended from temporary framework.



Keep vital construction materials well protected. Avoid loss and costly delays.

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

H. WENZEL TENT & DUCK
ST. LOUIS, MO.

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

ALABAMA
Owen-Richards Co., Birmingham
ARIZONA
O. S. Stapley Co., Phoenix
CALIFORNIA
Industrial Equipment Co., Oakland
CONNECTICUT
Gesner Equipment Corp., Hamden
DISTRICT OF COLUMBIA
Hudson Supply & Equipment Co., Washington, D. C.
ILLINOIS
Becker Equipment & Supply Co., Chicago
Joseph Behr & Sons, Rockford
Clark & Barlow Hardware Co., Chicago
INDIANA
Standard Equipment & Supply Co., Hammond
Van Camp Hardware & Iron Co., Indianapolis
IOWA
Hary Alter & Sons, Davenport
Pecaut Industrial Supply Co., Sioux City
LOUISIANA
C. T. Patterson Co., Inc., New Orleans
MARYLAND
General Supply & Equipment Co., Baltimore
MASSACHUSETTS
Hedge & Mattheis Co., Boston
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MICHIGAN
Eddy & Cuthbert, Lansing
C. L. Gransden & Co., Detroit
MINNESOTA
Equipment Rental & Sales Corp., Minneapolis
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MISSISSIPPI
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NEW YORK
Keystone Builders Supply Co., Rochester
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Trevor Corp., Buffalo
J. H. Welch Company, Inc., Buffalo
R. B. Wing & Son Corp., Albany
NORTH CAROLINA
Constructors Supply Company, Inc., Durham
Contractors Service Co., Charlotte
OHIO
Beck Supply Co., Columbus
Construction Equipment Corp., Cincinnati
Moriarty Machinery Co., Toledo
The W. T. Walsh Equipment Co., Cleveland
OKLAHOMA
The Victor L. Phillips Co., Oklahoma City
Mideke Supply Co., Oklahoma City
OREGON
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Howard W. Read Corp., Philadelphia
VIRGINIA
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CO. YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

Manufacturer's Activities

Personnel changes and new plans

HERMAN C. FRENTZEL, chief engineer, has been appointed works manager for the HEIL Co., Milwaukee, Wis. Mr. Frentzel joined the Heil Co. in 1930 to take charge of the oil burner and water system division. Later he went into the company's research laboratory and during this period became consulting engineer for the dehydrating department and others. In 1938 he was appointed chief engineer.

Employees of the CLYDE IRON WORKS, INC., Duluth, Minn., gathered recently at the company's plant to watch presentation of the joint Army-Navy production award.

E. C. BOWERS, president of the WICKWIRE SPENCER STEEL CO., recently announced that the new Wickwire automatic propeller is going into production. This is a variable pitch, fully automatic airplane propeller perfected by Wickwire engineers after two years of intensive development. Mr. Bowers said that while military secrecy forbids complete details of the propeller's operations, it will eliminate the requirement that the pilot change the pitch of the propeller.

ESSE E. ROUTH has been elected vice-president and director of sales of MATHIESON ALKALI WORKS, succeeding JOHN A. KIENLE, who retired recently. ROBERT J. QUINN was named assistant to the vice president in charge of sales, and D. W. DRUMMOND was appointed general manager of sales.

Announcement has been made by **CHARLES M. HINES**, president of **EDWARD HINES LUMBER CO.**, of the appointment of **LEO KRAEMER** as director of research in charge of all forest utilization, experimental and research activities for the company. Mr. Kraemer, formerly chief engineer for the lumber trade of Chicago as head of the CHICAGO LUMBER INSTITUTE, has devoted a greater part of his active life to lumber research.

THOMAS W. HOWARD, a controller of the NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION, has been appointed manager of the Department of Manufacture of the Chamber of Commerce of the United States.

DON C. STREETER has been appointed general sales manager of REO MOTORS, INC. He has been associated with Reo for 26 years in sales and service work, starting in the service department.

JULIUS H. MUELLER, 62 treasurer and board member of the LOMBARD GOVERNOR CO., Ashland, Mass., died recently at Framingham, Mass.

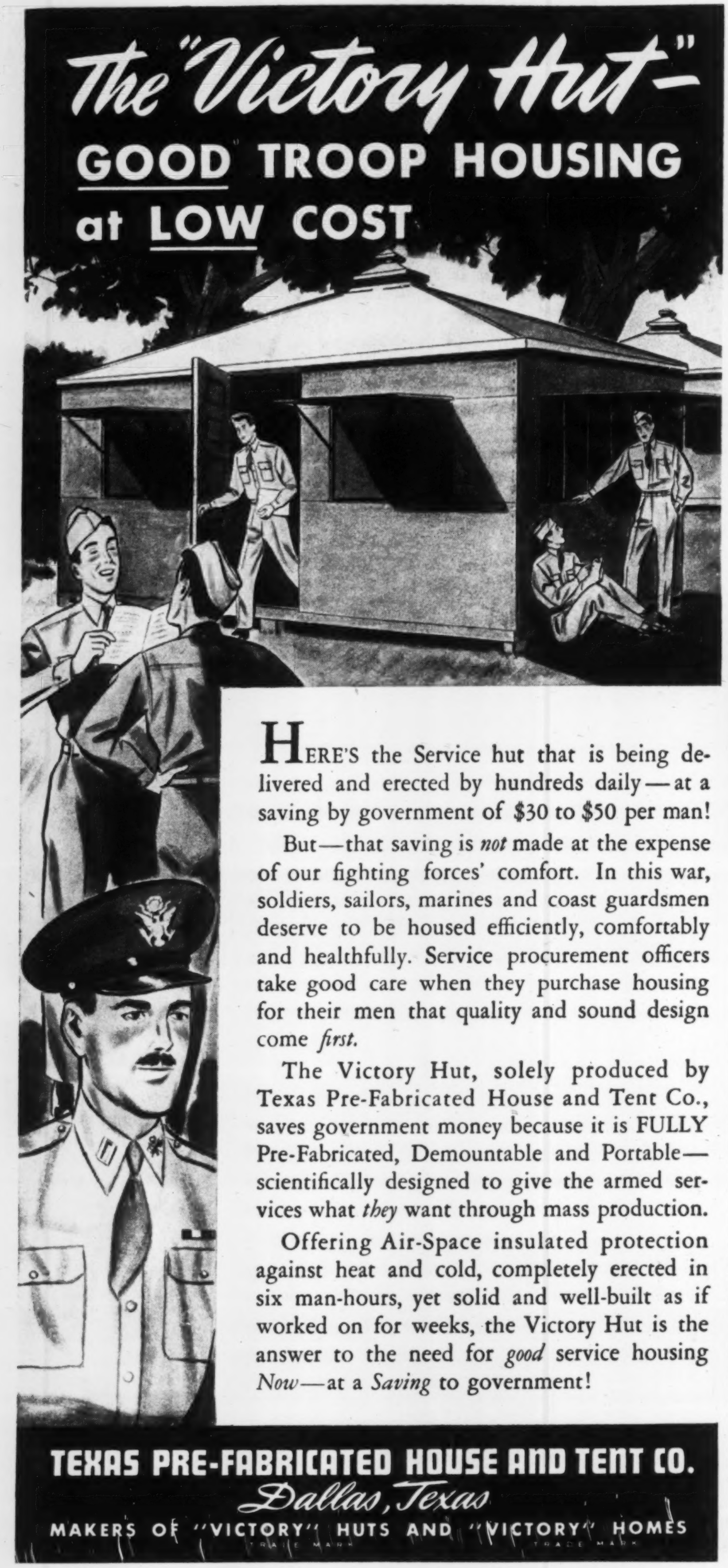
JOHN D. COOK, former vice-president and treasurer of the AUTOMATIC SPRINKLER CO. OF AMERICA, at Youngstown, Ohio, has joined the HERCULES MOTORS CORP., as comptroller and assistant secretary.

S. HORACE DISSTON, president of HENRY DISSTON & SONS, INC., was one of the speakers at recent ceremonies at the company's Philadelphia plant marking the presentation of the joint Army-Navy "E" award for efficiency in war production. Thousands of employees, gathered in a new division of the factory, cheered as the pennant was hoisted to the top of the flagpole before the flag-draped speakers' stand.

Another large-scale government-financed synthetic rubber plant has begun production operations, it is reported by THE B. F. GOODRICH CO., Akron, Ohio. The new plant, located in Kentucky, is an important unit in the government's synthetic rubber program. The plant will ultimately utilize butadiene made from alcohol and will shortly be in full scale production of general purpose synthetic rubber for use by the armed forces of the United Nations.

The NEW & USED EQUIPMENT CORP. has announced removal of its offices and yards to 44-68 Vernon Boulevard, Long Island City, N. Y.

CHARLES MCKEW PARR, chairman of the board of the PARR ELECTRICAL CO., Newark, N. J., and senior electrical consultant of the Distributor's Division of the


The "Victory Hut"—

GOOD TROOP HOUSING at LOW COST

HERE'S the Service hut that is being delivered and erected by hundreds daily—at a saving by government of $30 to $50 per man!

But—that saving is *not* made at the expense of our fighting forces' comfort. In this war, soldiers, sailors, marines and coast guardsmen deserve to be housed efficiently, comfortably and healthfully. Service procurement officers take good care when they purchase housing for their men that quality and sound design come *first.*

The Victory Hut, solely produced by Texas Pre-Fabricated House and Tent Co., saves government money because it is FULLY Pre-Fabricated, Demountable and Portable—scientifically designed to give the armed services what *they* want through mass production.

Offering Air-Space insulated protection against heat and cold, completely erected in six man-hours, yet solid and well-built as if worked on for weeks, the Victory Hut is the answer to the need for *good* service housing *Now*—at a *Saving* to government!

TEXAS PRE-FABRICATED HOUSE AND TENT CO.
Dallas, Texas
MAKERS OF "VICTORY" HUTS AND "VICTORY" HOMES
TRADE MARK TRADE MARK

War Production Board, was principal speaker and guest of honor at a recent meeting of the New England Electrical Representatives Club, held Dec. [illegible] at Boston, Mass.

W. A. MAY, district sales manager for **AUSTIN-WESTERN MACHINERY CO.**, at Memphis, Tenn., has moved his headquarters to Jackson, Miss., and he is representing the company in the states of Mississippi, Louisana, Tennessee, Alabama, Georgia, and Florida.

HAROLD W. LOW, 58, president of the **C. A. DODGE CO.**, Cambridge, Mass., construction organization, died recently.

Official recognition for excellence in the production of war materials has been received by the employees of **MACWHYTE COMPANY** from Robert B. Patterson, Under Secretary of War. The award was made as of November 21st, and is given to all men and women employed by the company on that date.

A. R. ABELT, secretary of the **CHAIN BELT CO.**, recently was elected a director to replace the late F. J. Weschler. In addition to his new post, Mr. Abelt was also elected a vice president. He joined the Chain Belt organization in 1907 and has served in many capacities which have included production, sales and executive work.

Production of rock drills, compressors, turbine well-pumps, anti-aircraft artillery and airplane parts has reached the stage of "outstanding achievement" at the plant of the **WORTHINGTON PUMP AND MACHINERY CO.** Recently, with an audience of 8,000 assembled in the gun mount division, Brigadier General Guy H. Drewry awarded the company the Army-Navy "E" award.

R. E. ROSCOE, vice-president in charge of operations of the **BESSEMER LIMESTONE & CEMENT CO.**, was elected a director at a recent meeting.

ROBERT I. INGALLS, JR., has been elected president of **THE INGALLS IRON WORKS CO.** succeeding his father, who remains as chairman of the board.

The **JAMES F. LINCOLN ARC WELDING FOUNDATION** of Cleveland, Ohio, sponsor of the 1937-38 and 1940-42 nationwide arc welding award program, recently announced its first award program in the field of undergraduate engineering study. The Foundation's new project is the

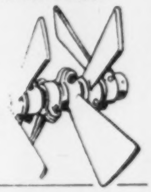
SNOW LOADERS

At upwards of 10 yards-a-minute capacity the *Haiss Model 75 Snow Loader* will take care of a heavy snowfall in jig time. And, what is more important, its Haiss-exclusive revolving propeller Self-Feeding Device will handle *dry snow, wet snow,* or *break-up* and load a *hard frozen mass.* For catalog details on this simple, sturdy, most practical machine, write, wire or telephone for Bulletin 1040.

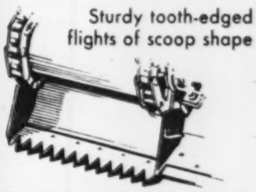
GEORGE HAISS MFG. CO., INC., 140th ST. and RIDER AVE., NEW YORK CITY

EXCEPTIONAL ENGINEERING ADVANTAGES

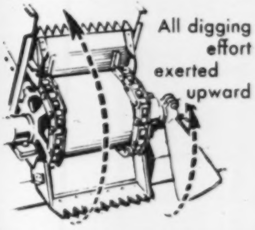
Revolving propellors cut into hard-frozen snow piles



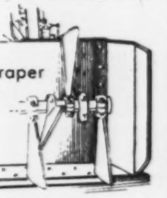
Sturdy tooth-edged flights of scoop shape



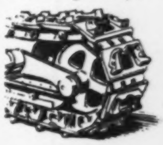
All digging effort exerted upward



Efficient clean-up scraper over 9 feet wide



Non-clog creeper treads with sure-grip grousers



HAISS QUALITY EQUIPMENT FOR 50 YEARS 1892 ★ 1942

HAISS

IT'S ONLY A LITTLE JOB BUT DON'T NEGLECT IT

So simple and so few are the service requirements of Twin Disc Clutches and Clutch Power Take-offs that they are often overlooked until *real* trouble—trouble which could have been prevented—"ties up the works."

Don't let this happen to your clutch. Don't fail to:

1. **Lubricate it regularly.** Your Twin Disc Clutch is lubricated from an easily accessible point: a grease cup fitted to the throw-out collar which needs only a turn or two. The Clutch Power Take-off collar should be lubricated *once a day* before starting work; the ball bearings every 50 hours of running. Pilot bearing is lubricated through drilled shaft.

2. **Adjust it properly.** Turn clutch until adjusting pin can be reached. Pull this pin out and turn adjusting yoke clockwise until operating lever requires a distinct pressure to engage. For adjustment of the Clutch Power Take-off, remove hand hole cover and turn clutch until adjusting lock pin can be reached. Then proceed same as with clutch.

Regular inspection on these two maintenance points will assure maximum performance and a full working life with minimum parts replacement and service for your Twin Disc Clutches. **TWIN DISC CLUTCH COMPANY**, Racine, Wisconsin.

Illustrated below: Left, Twin Disc Clutch Power Take-off for engines having up to 285 hp. output. Sizes: with single plate clutches, 6½" to 24"; double plate, 11½" to 18". Housing sizes: No. 6 S.A.E. to No. 00 S.A.E. Right: Twin Disc Model E Clutch, heavy-duty, enclosed type. Sizes 14" to 42" in single or two-plate assemblies.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.

$6750 annual engineering undergraduate award and scholarship program. Its object, as expressed in Rules and Conditions governing participation, is to encourage engineering students to study arc welded construction so that their imagination, ability and vision may be given opportunity to extend knowledge of this method. The program offers $5000 in student awards and $1750 in scholarships for the departments of the institutions in which the award-winning students are registered. The winning students will receive an additional honor, since the scholarship in his school will be given his name as "The John Doe Scholarship of the Lincoln Foundation." Any resident engineering undergraduate student registered in any school, college or university in the United States, giving a course in any branch of engineering or architecture, is eligible to submit a paper in the award program.

DEAN M. WARREN, formerly in charge of technical publicity at **GENERAL ELECTRIC'S** Nela Park laboratories, Cleveland, Ohio, has been transferred to the Empire division of the firm's lamp department at Buffalo. He will devote his full time to wartime lighting of industries in the Buffalo area.

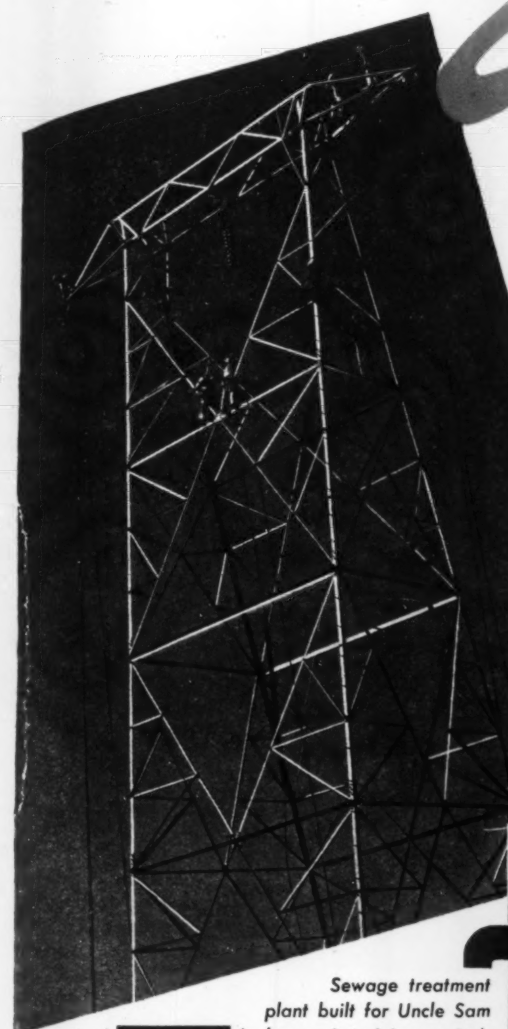
C. W. COOK has been appointed chief engineer of **GENERAL FOODS CORP.**, according to Udell C. Young, vice president in charge of production. Mr. Cook succeeds **ELMER J. GRIMMETT**, who recently became manager of eastern plants.

At the conclusion of a three-day war products service conference held at Pontiac, Mich., O. M. **BREDE**, general parts and service manager of **GENERAL MOTORS TRUCK & COACH CO.**, announced general satisfaction with the progress which GMC has made in its efforts to aid the army with its service problems. Mr. Brede said that the company now has more than 50 experienced service men contacting the army in the many camps throughout the nine service commands.

The **JOHN W. STANG CORP.** has announced the opening of a branch warehouse and service station at 2322 Newton Ave., San Diego, Cal. Wellpoint systems ready for prompt installation on construction jobs may now be obtained from this location, in addition to the main office at 2 Broadway.

HERMAN SEYDEL, director of research for the **CLOROBEN CORP.**, recently spent a month on the West Coast acting as guest

Who in Hell is *Ziebarth?*



IT'S A $64 QUESTION IF YOU DON'T KNOW—BUT ONLY A SIMPLE $2 QUESTION IF YOU DO! EITHER WAY, HERE'S INFORMATION YOU SHOULD HAVE!

Through early pioneering in the building of heavy power-transmission lines over the West's rocky mountains, mile-high lakes, and tortuous deserts, Ziebarth Construction acquired the creative engineering skills that today make it one of the Nation's leading construction firms.

Branching out from this highly specialized work, the Ziebarth organization of 1,700 trained men, headed by Fritz Ziebarth, now have under construction at various points of the United States, nearly a dozen jobs of considerable size. In addition to a $[redacted] power-transmission task for Basic Magnesium, these jobs include construction on other high-tension power lines, electrical sub-stations, airport lighting, sewage plants, water supply, pumping plants, personnel shelters, railroad signal installations, telegraph lines.

Hanging insulators on the 237-mile Boulder Dam electrical highway—completed eight months ahead of schedule! . . . The 300-mile Fort Peck Dam power-transmission line, another Ziebarth Construction project, is said to be the longest in the world without a single power tap.

Sewage treatment plant built for Uncle Sam —at [redacted] (a large air-training center).

WHENEVER OR WHEREVER YOU HAVE A TOUGH, HEAVY-CONSTRUCTION JOB—THAT MUST BE DONE ON *TIME*—CONTACT

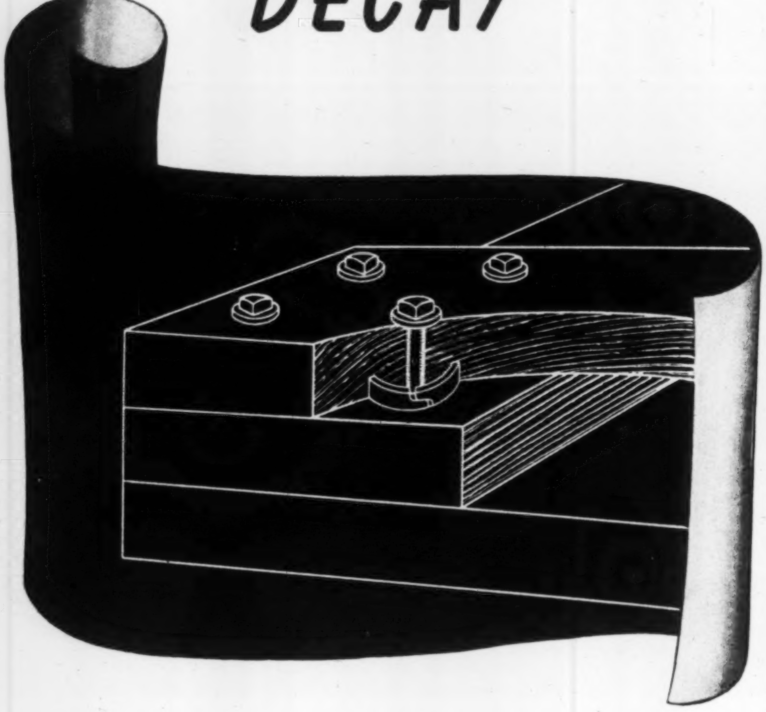
ZIEBARTH

CONSTRUCTION

FRITZ ZIEBARTH • 803 West Esther Street, Long Beach, California
Vancouver, Washington • Reno, Nevada

THE
STORY OF
Ziebarth
CONSTRUCTION

IF YOU are responsible for the engineering, building or purchasing of heavy construction—by all means write for the new, informative "The Story of Ziebarth Construction"! It's gratis.



On Guard Against

DECAY

STRUCTURAL joints, mortises, bolts, lag screws and nails depend upon sound, solid lumber. Protection of these vital spots is but one reason why "CZC" extends the service life of structural lumber many times under many types of severe service conditions. In addition "CZC" preserves the load-bearing capacity and reduces the need for over-size timber to allow for depreciation of strength due to decay.

"CZC" treatment gives lumber lasting protection against decay, termites, and imparts measurable fire resistance. In addition, "CZC" treated lumber is clean, odorless and paintable. It possesses all the fabrication advantages of lumber.

Write for full information about its many advantages for essential construction.

Plants equipped to render "CZC" treating service are located throughout the country.

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wil., Del.

"CZC" treatment is a recognized standard covered by Master Federal Specifications: TT W 551 chemical composition; TT W 571B use specification currently available for permissible construction.

DU PONT

REG. U. S. PAT. OFF.

CZC

Chromated Zinc Chloride

WOOD PRESERVATIVE

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

consultant to the company's agent, the Los Angeles Chemical Co.

Scrap totaling 1,023,327 pounds, or nearly one-sixth of the total amount collected by all the plants in the busy Passaic, N. J., industrial area, was turned in by the MANHATTAN RUBBER MFG. division of RAYBESTOS-MANHATTAN, INC., during the first six months of the WPB industrial scrap drive.

CHARLES L. HUSTON, JR., director of personnel relations of the LUKENS STEEL CO., and a member of the company's board of directors, has been appointed assistant to the president of the company. Mr. Huston joined Lukens as director of personnel relations in September, 1939, after serving ten years with the AMERICAN ROLLING MILL CO. He is a member of the Industrial Relations Committee of the AMERICAN IRON & STEEL INSTITUTE, and a member of the ASSOCIATION OF IRON & STEEL ENGINEERS.

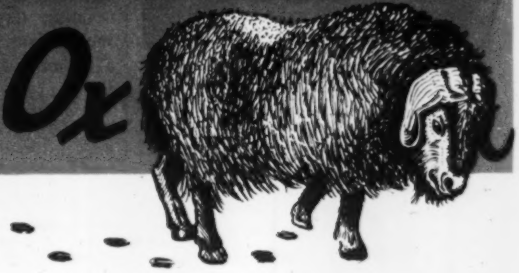
CHARLES H. MERCER, formerly consulting engineer in the fabricated steel construction division of the BETHLEHEM STEEL CORP., retired from active service on Nov. 1. Mr. Mercer's service with Bethlehem and predecessors dates from May 1, 1899, when he entered the employ of the Pennsylvania Steel Co., subsequently becoming chief engineer of the bridge and construction department of that company.

GEORGE J. TAYLOR, industrial lighting engineer at GENERAL ELECTRIC's Nela Park laboratories, has been promoted to the post of wartime lighting engineer at the company's Atlantic division, with offices in New York City. In his new work, Mr. Taylor will work closely with many government war production authorities who recently have been transferred from Washington to the New York-Newark area.

M. G. HUNTINGTON, with the B. F. GOODRICH CO. since 1923, has been named manager of the Washington office of the company's national sales and service division. Huntington joined the company immediately after graduation from the University of Minnesota and after extensive experience in various sales capacities became advertising and sales promotion manager of the company's associated lines division.

Takes to Muskeg like

a Musk-Ox



Too bad they didn't have Baker Hydraulic Bulldozers during the Klondike Gold Rush. The way they performed on the Alaska-Canada Highway, and Airbase and Supply Depot construction up there, you would think they were first cousins to a Malemute sled dog. Bakers are tireless workers.

They helped to carve roads through spongy muskeg swamps—like eating soup with a fork—but they did it. They bowled over enough trees to keep a hundred pulp mills busy; made cuts in tough shale and heavy gravel; spread, graded and leveled; pushed mired dirt-buggies; rolled logs for bridges, and whatnot. Bakers are versatile.

When the freeze set in, Baker's direct hydraulic down pressure—which puts the full weight of the tractor front end on the blade—was just what was needed to get the finishing touches done.

Bakers keep delivering, even in the frigid zone—use plain fuel oil in the hydraulic system. Ask Comrade Ivan! Bakers took to the Russian tundra like a Siberian musk-ox. On every front, Bakers are bringing *hydraulic pressure* to bear on the enemy!

THE BAKER MFG. CO.
567 Stanford Ave. Springfield, Ill.

May we send a copy of "Unsung Heroes of War"?

BAKER *The Modern Tractor Equipment Line for*
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

I'LL TAKE THE WHITE ONE EVERY TIME!

WYTEFACE "A" TRADE MARK STEEL TAPES

K&E
REG. U. S. PAT. OFF.

GRADUATED IN INCHES OR TENTHS

EASY-TO-READ, *raised* black graduations on crack-proof white surface . . . resist abrasion from rock, sand, scraping over rails, pipe, concrete, etc. In all sizes and types—in cases or reels. Ask your dealer—or write for catalog.

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CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • DETROIT • MONTREAL

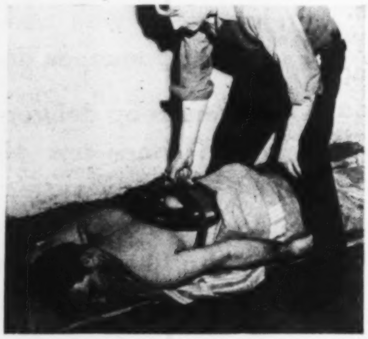
New Aids to Constructors

(*Continued from p.* 100)

flow records on the same chart for ready comparison, the new two-pen Cochrane electric flow meter achieves the result without complication and with no loss of accessibility, according to the manufacturer. Both receiver mechanisms can be swung out and operate in the swung-out position. The connection between the rear receiving mechanism and its pen arm must necessarily be detachable and is arranged with a self-aligning V-notch junction. Where two related measurements are involved, the operator has sufficient guidance by observing the coincidence of the two pens. For cases where continual reference must be made to this relationship of the two records, ratio indicating pointers can be incorporated. Integrating feature can be furnished on both mechanisms, but reading of the rear mechanism integrator requires opening case and swinging the front mechanism forward.—*Cochrane Corp., 17th and Allegheny Ave., Philadelphia, Pa.*

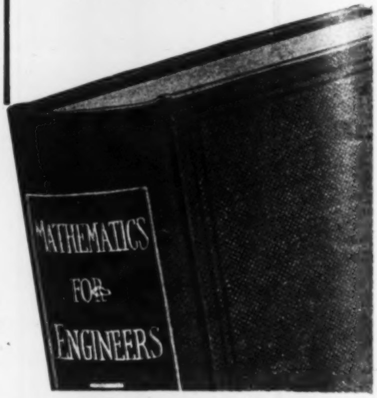
Rubber Lung

A revolutionary device known as the rubber lung for administering artificial respiration is now on the market. The manufacturers recommend the rubber lung to supplement and increase the effectiveness of Schaefer prone pressure treatment to restore breathing suspended through shock, fumes and gases. As illustrated here, the device is strapped to the back or stomach of the victim and adheres to the body through suction. Raising and lowering the lung handle at normal breathing rate activates the muscles of the victim, causing them to draw in and exhale air. According to the manufacturers, the rubber lung may be used safely by even a totally inexperienced person.—*E. D. Bullard Co., 275 Eighth St., San Francisco, Cal.*



Wire Cutter

Hot electrical wires can now be cut



MATHEMATICS YOU NEED
in the form you need it!

Experience showed Raymond W. Dull that for the practicing engineer a special kind of mathematics book was necessary. Convenience required that he have certain mathematical information available for quick reference. For this reason he prepared his own notes on mathematics in the course of his long engineering practice. At the suggestion of other engineers, Mr. Dull revised and extended his notes and the result of this was

MATHEMATICS for ENGINEERS
By RAYMOND W. DULL
Consulting Engineer
2nd Edition, 780pp., 5½ x 8, illus., $5.00

This book gives you the mathematics you need in the form you need it. It is concise yet complete, a book for reference or study, as you wish, covering every phase of mathematics you are likely to meet, from simple numeric computations, through integration and summation. It is the kind of book that you will use again and again for a long period of years; and each time you use it, you will congratulate yourself on having it at hand.

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Send me Dull's Mathematics for Engineers for 10 days' examination on approval. In 10 days I will send you $5.00 plus few cents postage or return book postpaid. (We pay postage on orders accompanied by remittance.)

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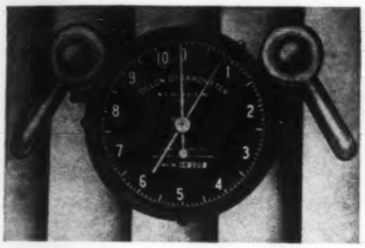
at a safe distance from the danger zone, through use of the Longrange Cutter introduced by the American-LaFrance-Foamite Corp. The cutter is said to be of entirely different design than the short, conventional double handled wire cutter that requires the close proximity of the operator. The Longrange cutter will handle either energized or cold lines. Slotted jaws hold the wire by gravity until the cut is made. The wire cannot escape as the jaw closes at the outside first. Cutting action is from the outside in, with 1½ in. jaw openings that will take heavily insulated wire. The two 4-ft. sections of selected Douglas Fir or spruce comprise the handle, insulation-tested for 75,000 volts per foot.—*American-LaFrance-Foamite Corp., Elmira, N. Y.*

Dynamometer

A new model, "AN" Dillon Dynamometer, is now ready for distribution. This product is designed to accurately measure tension of applied stress, with speed and accuracy. According to the manufacturers, they are virtually unlimited in their application for use in field tests, on the production line, or in laboratory setups. They may be used to indicate tension in wire, cable, rope; or when hooked in series with mechanical testing apparatus to measure flexure or fatigue limits. Assembled and calibrated by skilled technicians, all parts are rigidly inspected for mechanical perfection before shipment. Precision machining assures ultra-smooth operation, and injury by overload is eliminated as the mechanism automatically disengages itself when once rated capacity is reached. Each instrument is calibrated to an accuracy of 2 percent plus or minus. The instrument measures 8¼ x 6¼x3 in. They have a ¼-in. shadow-proof safety glass crystal, with rubber gasket to seal the dials from dust and dirt.—*W. C. Dillon & Co., 5410 West Harrison St., Chicago, Ill.*



Wartime Trident Meters

The Neptune Meter Co. has announced that its line of Trident cold water meters and repair parts in all sizes and types are now being manufactured to meet the material restrictions of the War Production Board's Water Meter Limitation Order L-154. All cast iron parts are given

The **BUDA** *"all purpose"* **JACK**

MODEL 2215-S
IMPROVED
AUTOMATIC-LOWERING
RATCHET JACK

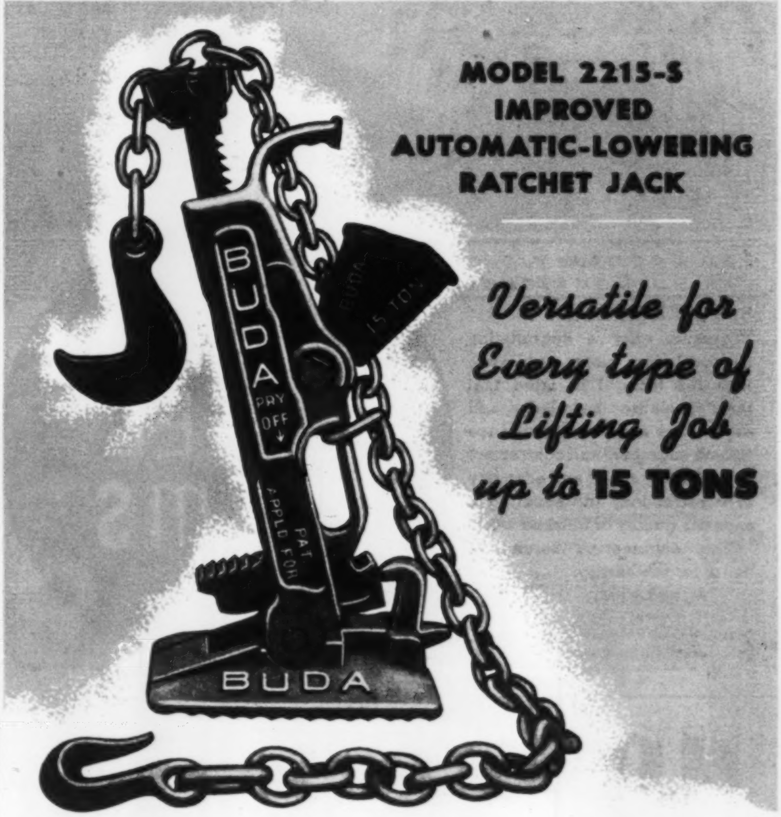
Versatile for Every type of Lifting Job up to **15 TONS**

THIS husky Buda "All Purpose" Jack is all that its name implies—it is designed and built to handle the widest possible range of lifting jobs, up to 15 ton loads. Here are some of the outstanding features which make this improved model a favorite on construction and erection jobs:

- **Newly designed heavier, wider base assures ample support, greater safety.**
- **5 ft. chain with double hooks extends range of use—ideal for pole pulling, lifting vehicles, machinery, heavy equipment, etc.**
- **Hinged base permits raising and lowering loads vertically or on an angle.**
- **Double lever socket facilitates lifting.**
- **Simple reversing lever operated, without stooping, by pushing with foot or lever bar.**

Write for the handy BUDA jack book . . . facts and figures on over 170 models in the complete BUDA jack line!

THE BUDA COMPANY
HARVEY (CHICAGO SUBURB) ILLINOIS
Diesel and Gasoline Engines—Railroad Equipment—Lifting Jacks—Earth Drills—Shop Trucks



for Economy in Construction

BLAW-KNOX STEEL FORM Engineers offer a consultation service before plans are drawn, with the thought in mind that their specialized knowledge and experience may be of assistance to both engineers and contractors in promoting speed and economy in construction, and securing a superior quality of finished work.

This engineering service is yours for the asking.

BLAW-KNOX STEEL FORMS

BLAW-KNOX DIVISION
of Blaw-Knox Company
Farmer's Bank Bldg. Pittsburgh, Pa.
New York Chicago Philadelphia Birmingham

NO Winter FREEZE-UPS

Even though duly delegated man-power may have instructions to provide against power equipment damage or slowdowns resulting from cold weather . . . the human equation can't always be depended upon to make good on its responsibilities.

There is nothing to freeze in a Wisconsin heavy-duty air-cooled engine. AIR-COOLING, and the ability to start easily in any weather . . . to run *continuously* under a full working load, on any kind of job within its power range . . . these are factors that logically make Wisconsin Engines the preferred year-round power.

Model VE-4 V-type 4 cyl. engine. Other types and sizes, 1 and 4 cyl. 1 to 35 hp.

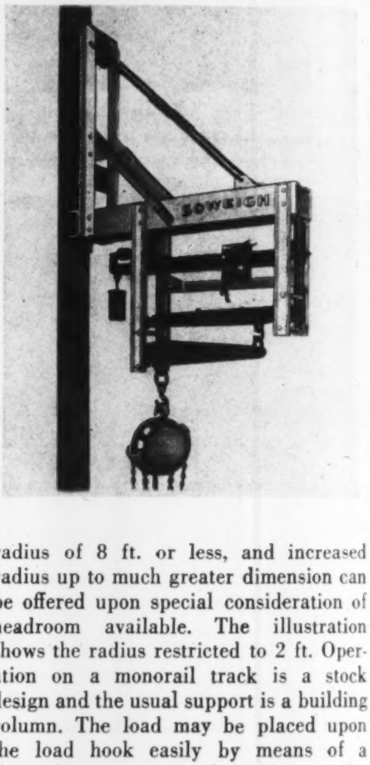
MOST POWER Per POUND

WISCONSIN MOTOR Corporation
MILWAUKEE, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

a protective coating of corrosion-resisting paint and steel bolts, studs, nuts and washers have a protective plating. It is claimed that all parts manufactured will be interchangeable with those of meters already in service in accordance with the established policy of the Neptune Co. Lambert and Thomson meters will not be manufactured for the duration of the war. However, repair parts for these meters will be available.—*Neptune Meter Co., 50 West 50th St., New York, N. Y.*

Radial Weighing Scale

The Radial is a shop and factory scale designed to yield net weights without tare and to be available for service over a definite floor area without permanent reservation of any floor space. This scale can be furnished from stock designs to enable the load hook to swing over a radius of 8 ft. or less, and increased radius up to much greater dimension can be offered upon special consideration of headroom available. The illustration shows the radius restricted to 2 ft. Operation on a monorail track is a stock design and the usual support is a building column. The load may be placed upon the load hook easily by means of a chain hoist, or manual tackle may be devised for the purpose. In any case, the hoist or tackle can be balanced off as part of the dead load of the lever system, and thus the result read is net weight. The scale is available in capacities of 4000 and 6000 lb. for immediate delivery. A choice of weighbeam equipment is offered to allow normal rapid hand weighing or else stamping of weights on tickets.—*Soweigh Scale Co., Delavan, Ill.*

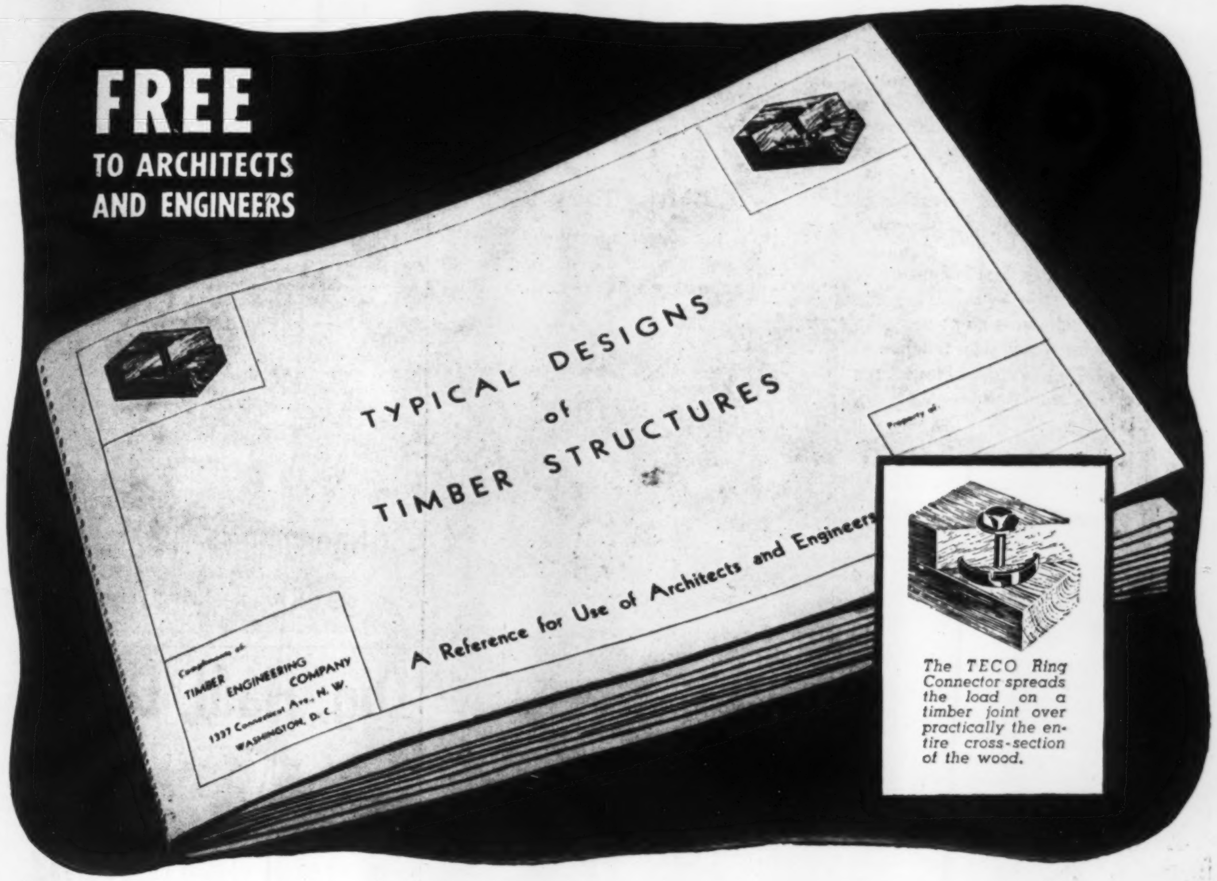


Glass Reflector

Westinghouse Lighting Division has announced an improved industrial yard light, which provides about 10 per cent

"ONE OF THE MOST USEFUL PIECES OF WORK THAT I HAVE RECEIVED IN 20 YEARS"..

WRITES ONE ARCHITECT


FREE
TO ARCHITECTS
AND ENGINEERS
TYPICAL DESIGNS
of
TIMBER STRUCTURES
A Reference for Use of Architects and Engineers
Compliments of
TIMBER ENGINEERING COMPANY
1337 Connecticut Ave., N. W.
WASHINGTON, D. C.
Property of

The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood.

AND HERE'S WHAT SOME OTHERS SAY:

"An excellent reference book at a most appropriate time. Thank you!"

"Many thanks. Best thing I've seen. Much appreciated."

"These designs are a great time saver to the architect."

"A very commendable job in bringing data to the architect, of high practical value."

In TYPICAL DESIGNS OF TIMBER STRUCTURES we have grouped the plans of 45 representative types of timber structure that have been *engineered* by the TECO System of Construction. A request on your professional letterhead will bring you a copy of this valuable reference book.

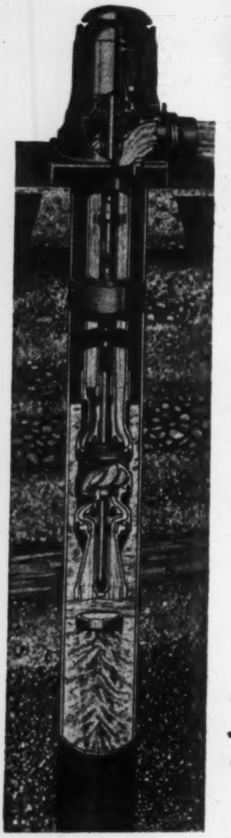
Timber ENGINEERING COMPANY

WASHINGTON, D. C. PORTLAND, OREGON

PEERLESS PUMPS PROVIDE A SECOND FRONT IN VALUE

NOW, with critical conditions of materials, war orders and necessarily high priorities limiting the supply of Peerless Pumps to our regular trade, a second front has been opened. That second front is service. A pump in good working order replaces the need for a new Peerless. So Peerless dealers and servicemen are aggressively taking action to make your Peerless Pump last for the duration. Repair parts, maintenance hints, and other means of prolonging the life of your Peerless Pump, are available at your Peerless Pump Dealer or Serviceman.

JOIN the popular movement of pump conservation for you, your pump and your country. Get further details from your Peerless Dealer this week.



PEERLESS PUMPS

PATENTED DOUBLE SEAL

DOUBLE BOWL BEARINGS

WIDEST RANGE OF CAPACITIES

UP TO 15,000 G.P.M. IN TURBINE TYPES

UP TO 200,000 G.P.M. IN HYDRO-FOIL PROPELLER TYPES

ALL FORMS OF DRIVE

NATIONWIDE SUPER SERVICE

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Ask for Literature.

Also inquire about Peerless Gasoline and Fuel Oil Pumps for direct refueling and transfer.

PEERLESS PUMP DIV.—Food Mach'y. Corp.
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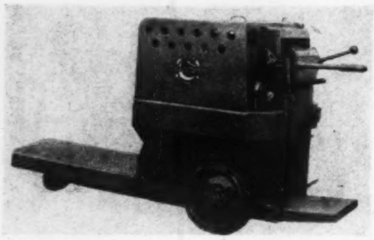
WATER OR OIL LUBRICATION
Peerless
TURBINE PUMPS

more illumination. There are two reasons for this increased efficiency, according to Westinghouse engineers; the mirror glass reflects more light than aluminum, previously used, and it extends below globe clamping ring that formerly blocked off part of the reflected light. These new lights are so designed that the silvered glass reflectors are interchangeable with previously manufactured aluminum units, thus making it possible for the new unit to be used on old equipment without the expense of buying complete units.—*Westinghouse Lighting Division, Westinghouse Electric & Mfg. Co., Cleveland, Ohio.*

Carrier Truck

A low lift elevating truck, 4,000 to 6,000 lb. capacity, and a smaller unit of 2,500 lb. capacity with foot lift as illustrated above, is now available. This particular unit can be used with 7-in. hand truck skids, and is recommended by the manufacturers for handling light and medium weight loads. Its rugged and durable construction provides an economical unit for inter-floor transportation.—*Crescent Truck Co., Lebanon, Pa.*



Static Conductive Linoleum

Designed to overcome the hazard caused by static electricity in the presence of vapors from combustible substances, and dust from explosives or from any substance that combines with oxygen, Congoleum-Nairn, Inc. has announced Nairn static-conductive linoleum. The new flooring is non-sparking and highly conductive of static, yet is said to provide adequate protection against accidental grounding from service voltages. Produced especially for use on floors and tables in powder and loading plants, it also finds valuable application in areas where solvent vapors or dust constitute fire hazards and for hospital operating rooms where explosive mixtures of ether and air may occur. Produced in standard width of 6 ft., it is installed like ordinary linoleum, giving the same advantage of freedom from multiple joints. It is said to be highly resistant to repeated washings with hot and cold water and will not wrinkle or buckle under ordinary conditions of use. —*Congoleum-Nairn, Inc., Kearny, N. J.*

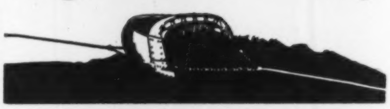
TOUGHEST TEST
of Welded Fabric Quality

Clinton Welded Fabric is the choice of experts for circular and other concrete shapes. UNIFORMITY, both in welding and in tensile strength, raises performance standards, and assures maximum strength at welds. *Every step* in manufacture is completed in our own plant From blast furnace to wire, to electrical welding, it is supervised and tested by our own experts. Clinton Welded Fabric comes in sheets or rolls, cut to your *exact* job specifications . . . saving you the time, trouble, and expense of on-the-job cutting and placing. Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.

WS
WISSCO PRODUCTS

CLINTON REINFORCING FABRIC
It's Electrically Welded
WICKWIRE SPENCER

Dig, Haul, Dump



in one operation!

On jobs where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway is a great money-saver because it will dig, haul and place the materials without the help of other equipment.

First cost of a SAUERMAN machine is reasonable, maintenance expense is small, and the simplicity of operation permits easy one-man control of even the largest installation.

This equipment is very flexible and is readily adapted to meet new and difficult working conditions. Sizes range from small portable units designed for cheap handling of a small hourly tonnage of loose materials up to powerful machines that will move as much as 1,000 tons per hour of the toughest materials.

Write for our catalog and see for yourself how others have cut costs on hundreds of dig-and-haul jobs with SAUERMAN Machines.

SAUERMAN BROS., INC.
532 S. Clinton St., Chicago

AHEAD OF TIME!
The Alaskan Highway

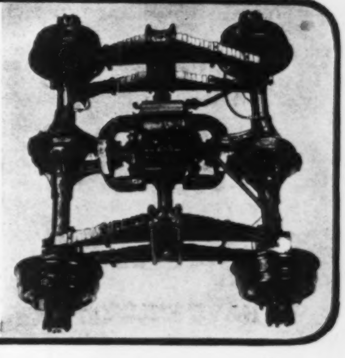
AMERICA'S LIFE LINE to the NORTH IS OPEN!—

Operating months ahead of even the stiff schedule set up by Army engineers!

A tough assignment in rough country calling for husky, durable, efficient equipment — and right on the job is a big fleet of trucks with

THORNTON
FOUR-REAR-WHEEL
DRIVE

Put TWO driving axles under the load instead of one, double the gear speeds, improve springing and load flotation, gain vastly superior tractive ability.



By means of **THORNTON** installations these trucks have been converted from 1½ to 2-ton vehicles into heavy-duty, four-rear-wheel drive trucks handling 6-yard dump bodies.

Standard heavy duty trucks are not available today—but here is the answer to that problem. You can convert new or used 1½ to 3-ton trucks to husky, reliable heavy-duty units of more than twice the capacity. They actually do the job better and cost less.

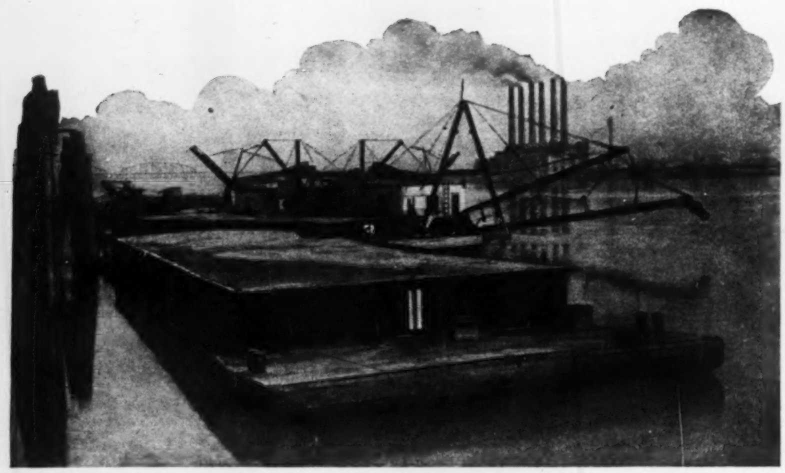
While Uncle Sam still approves, act quickly! Contact your nearest Truckstell-**THORNTON** dealer or wire the factory direct. Trained men will engineer this equipment to suit **YOUR OWN PARTICULAR JOB.**

THORNTON TANDEM CO.

8729-8779 GRINNELL AVE. DETROIT, MICH.

Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL

"When you need TRACTION you need THORNTON"

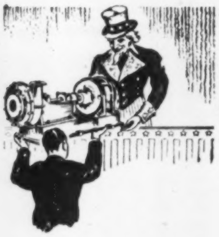


Here's a kind of QUICKSAND that any sand and gravel producer would like

A 575-ton barge of sand loaded in 55 minutes . . . that's QUICK SAND production provided by a Morris 15-inch Hydraulic Dredge. In addition to speedy production, the operating and maintenance costs are remarkably low, too. One engineer, one pump man and assistant and one deck hand comprise the entire crew of the dredge which takes sand from the river bottom, screens the material and loads it onto barges. In a 9-hour day, the cost of fuel, lubricating oil and supplies is about $6; and total yearly repair costs, exclusive of lines and cables, were less than $30.

Speedy, economical sand and gravel production is characteristic of Morris Hydraulic Dredges. Whether your deposits are loose, gravelly, compacted or clayey, you can assure most effective operation with a Morris Dredge.

WE HAVE ENLISTED



"FOR THE DURATION"

We have placed at the disposal of the Government all our facilities that might be of use in the national war effort. But our remaining facilities are at your service, and also the advice of our engineers to help you secure best results from your present equipment and to plan for your future needs.

MORRIS MACHINE WORKS

MORRIS
ESTABLISHED 1864

BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

NEW PUBLICATIONS

War Work—"Ilg Fights Its Second War" headlines a colorful new brochure now being distributed by the Ilg Electric Ventilating Co. of Chicago. In 42 photographs the company pictures the use of Ilg self-cooled motor propeller fans, universal blowers and unit heaters in both recent world conflicts, and gives a general picture of the company's activities.—*Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.*

Dredges—A 24-page catalog on hydraulic dredges and dredging equipment has just been published by Morris Machine Works. The material in the catalog includes sectional views and exteriors of various types of dredges, many illustrations of these dredges at work on various operations, and complete descriptions of many types of centrifugal pumps and accessories.—*Morris Machine Works, Baldwinsvilie, N. Y.*

Mixers—Straightline Mixers for flocculation tanks at sewage and water treatment plants are covered by a new 4-page illustrated folder No. 2042 published by the Link-Belt Co. With shaft parallel to flow and paddle rotation across the flow, these slow mixers produce a spiral mixing action that builds up a swirling motion in the liquid as illustrated in the folder. The use of pivoted paddles gives an installation added flexibility not obtainable with fixed paddles.—*The Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.*

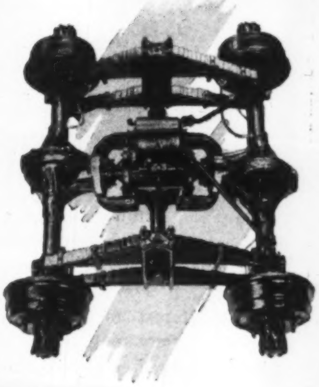
Lubrication—A new graphite lubrication handbook that explains the work which graphite performs and lists the various products supplied has been issued by the Nassau Laboratories. There is an indexed list of applications that the lubrication engineer will find helpful in keeping his machines at the peak of their performance. — *Nassau Laboratories, Hackensack, N. J.*

Concrete Plant—A new bulletin, No. 185, describing ready mixed concrete plants, has been issued by the Butler Bin Co. An unusually comprehensive booklet, the publication may be of great value to engineers contemplating a ready mixed installation either for commercial operation or for construction.—*The Butler Bin Co., Waukesha, Wis.*

Redwood—The essence of what makes Redwood tick is highlighted in a colorful, four-page circular released for distribution by the California Redwood Association. Subject matter of the bulletin covers authentic information gleaned from a U. S. Government bulletin,—

ALCAN *Construction*

utilized hundreds of **TRUCKSTELL** Conversions of 1½ TON TRUCKS



DRIVING of the ALCAN highway through five weeks before schedule established new records—in international cooperation—in Army efficiency—in engineering and contracting ability—in unprecedented speed of road building against difficult conditions rarely encountered.

To meet the need for trucks "that could take it" dependence was placed upon hundreds of Ford Trucks *converted by the TRUCKSTELL method* into rugged, powerful, heavy duty units.

Each truck, engineered by Truckstell, was equipped with a THORNTON Four Rear Wheel Drive and a 4 to 6 cubic yard Anthony Dump Body.

Greatly increased traction gained by two driving axles instead of one—double gear speeds—and improved flotation—enabled these trucks to haul capacity loads through muck and mire and contribute substantially to the success of the project.

TRUCKSTELL pioneered the method of building "Little Trucks into BIG ONES". This system, now approved by Government officials, has produced thousands of trucks, some of which are operating on practically every Government project.

Investigate the TRUCKSTELL method of converting any make of medium truck into a complete heavy unit; also the different kinds of truck equipment available for meeting every need.

THORNTON
Four Rear-Wheel-Drive
CONVERSIONS

●

TRUXMORE
Trailing 3rd Axle
CONVERSIONS

●

CLARK
Automatic Booster
CONVERSIONS

●

HEAVY DUTY
Clark Axle
CONVERSIONS

●

EATON
2-Speed Axles

●

CLARK
SPOKE WHEELS

●

DIAMOND
Safety Gas
TANKS

●

WATSON-BROWN-LIPE
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Make Your Stationary Equipment
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These strenuous days call for easy, flexible portability of all types of machinery. Just tell us the size and weight of the unit, and the likely speed and road conditions. Our years of engineering experience will assure you of sound, practical aid in developing an efficient mounting—wheels, axles, tongue, springs, etc.

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Tough terrain?
LE ROI COMPRESSORS
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Le Roi Compressor designed to operate on gasoline or butane. Tank in foreground carries extra butane supply.

When you hook your tools onto Le Roi Compressors, you have a combination that really clicks . . . the only outfit with engine and compressor built by the same manufacturer. Quickly towed *to* the job, easily moved about *on* the job. Practical design and rugged construction for continuous, economical service. Heavy-duty valve-in-head engine insures minimum lost time, lower repair costs. You make a creditable record, with Le Roi's on your jobs.

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C-13

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"California Redwood and Its Uses"—published by the Forest Products Div. of the Department of Commerce. Discussion covers the physical, mechanical and chemical properties of Redwood that make it the specialty wood that has proved valuable to the current defense effort. Including illustrations of Redwood in use, the bulletin also contains a table on the "Average Comparative Properties of Clear and Virgin-growth Redwood Compared with a Number of Other Species" reprinted from a technical bulletin of the Forest Products Laboratory of the U. S. Forest Service. There follows a partial but long list of industrial uses of Redwood.—*The California Redwood Association, 405 Montgomery St., San Francisco, Calif.*

Frequency recorders—"Micromax Frequency Recorders and Indicators" are described in a 20-page catalog just issued by Leeds & Northrup Company. This new catalog supersedes the previous (1938) publication on this subject. Widely used in central stations and in industrial power plants, the equipment described enables power producers to effect substantial economies in system regulation and at the same time improve the qualities of service they give the consumer. Because of the ever-increasing interconnections of generating units, stations and systems, frequency control has become a vitally important factor in overall system regulation.—*Leeds & Northrup Co., 4934 Stention Ave., Philadelphia, Pa.*

Skin protection—Announcement of the M.S.A. FEND, industrial skin creams and lotions for barrier protection of the worker's skin against industrial dermatitis, of interest to industrial medical directors, safety engineers, and plant executives concerned with checking the urgent problem of industrial dermatitis and keeping men and women on the job without loss of time and production, is included in a new bulletin issued by the Mine Safety Appliances Company. Each of the six different types of FEND products illustrated provide protection against a number of specific skin hazards.—*Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.*

Pointers—"Pointers on Rebuilding and Hard Facing Construction Equipment" hard facing alloys is a new pocket-size booklet issued by the Stoody Company to assist engineers and project managers in facing one of their most difficult problems on the job. The booklet says that in both the case of contractors who are not working on essential projects and who find difficulty in obtaining repair parts for equipment; and those engaged in war work who

"I'LL TAKE THE HY-LOAD"
CHIEF ENGINEER
MADE IN U.S.A.

SAYS THE MAN who knows his bearings, "because heavy loads are taken in stride by high-capacity Hyatt Hy-Load Roller Bearings."

That's why, in America's drive for more and more production...with machinery geared up to punishing speeds you'll find Hyatts carrying the load. And in the Tanks...Trucks...Guns... Ships...Planes, which these machines build, Hyatts are also serving.

Yes, the men who know their bearings say, "I'll take the Hyatt Hy-Load Bearing for tough jobs." And to back up their judgment are fifty years of Hyatt application in all types of industrial, automotive, and farm equipment... without ever letting the builders down.

Nor will they let Uncle Sam down for, as they guard the machines that run farms and factories, they also carry the bearing loads of the machines that fight.

Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

THE 50TH YEAR OF HYATT ROLLER BEARINGS

Veteran Weldor Tells How to
"Make Something from Practically Nothing"

* * *

In an interview with "Pop" Braun, who keeps equipment in service for Weston & Brooker Company, at their quarry, Camak, Georgia, some hints were dropped which may prove helpful to other maintenance men and job weldors. This company produces a large volume of granite and the abusiveness of shot granite on excavating equipment is well known.

When the writer stopped in, "Pop" was making a final inspection of a dipper he had been working on. "What are you doing to this one?", he was asked.

"Taking a crack at the Japs," said Pop, "by making something out of *almost* nothing. We had this old dipper, which had been held for a spare, and I figured that if we could build it up so that it would be serviceable, it would do the job until the Japs were licked and then we could get a new one."

"Pop" reported that the dipper was badly worn all around, but that there were no real cracks in it. He used this method:

Short pieces of molybdenum-manganese steel filler bars—both round and square, were tacked on along the edge of the worn down lip and Amsco Nickel Manganese steel rod (now replaced by V-Mang molybdenum-manganese steel rod) applied to fill in around the bars and to round out the shape. (See A204.)

The space between the teeth was built up similarly. Where the lip is thick and much metal had worn away, "Pop" used a piece of manganese steel cut from scrap to make a "backer." This was welded in place, providing the preliminary shape and several round filler bars were placed on the outside to make up the thickness and for reinforcement. Built up in this way, you have a lip that "can take it," to quote Mr. Braun, "provided, of course, that you use a good rod like Amsco's."

"Pop" tacked a filler bar on the edge of the outside tooth bases, as shown (A286), to protect the rest of the tooth bases, retarding wear at that point. It is easy to do, almost a ready-made job because of the rounded edge, and does not cost much, he reports.

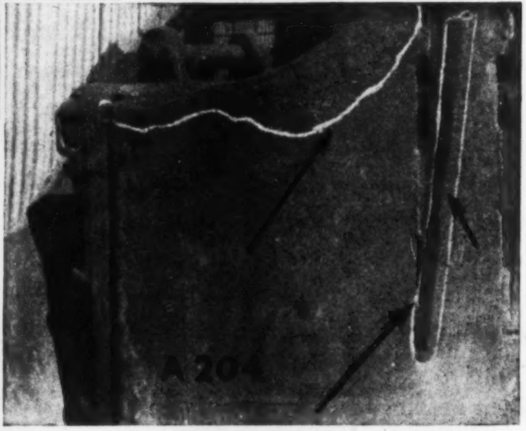
Note how the heel has been built up at the corners. Four or five round or square bars are bent cold, tacked on, and welding rod filled in between so as to present a good heavy pad to take the wear. The latchkeeper was built up similarly.

Wear was almost unnoticeable on a dipper salvaged in the same manner, which had been in service nearly seven months.

When asked if he used Amsco Hard Surfacing Welding Rods, "Pop" stated:

"We don't use them much here because the stone is hard enough to work-harden the manganese steel so that we get mighty good wear from it. In handling softer, more abrasive stone, I would use some kind of hard facing, like Amsco Economy."

Thanks, "Pop" Braun, maybe this information will enable other weldors to "take a crack at the Japs" by making present equipment, subject to impact and abrasion, last longer through the application of Amsco Reclamation and Hard-Surfacing Materials.



Bulletin 941-W pictures parts used in many industries that can be "made to do" by salvage welding.

Amsco
AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRAKE SHOE & FOUNDRY CO.
Chicago Heights, Illinois

Manganese Steel Castings for shocks and abrasion.
Chromium-Nickel Alloy Castings for heat and corrosion resistance.
Power Shovel Dippers. Dredge and Industrial Pumps.
Welding Materials for reclamation and hard-surfacing

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LOS ANGELES, CALIF.; ST. LOUIS, MO. OFFICES IN PRINCIPAL CITIES

must avoid all unnecessary prompt replacements, Stoody hard facing alloys are making important savings. For example, worn equipment rebuilt and hard faced lasts as long as new parts and often longer, the manufacturer claims. Containing diagrams and other details, the booklet is available immediately.—*Stoody Co., 1134 West Slauson Ave., Whittier, Calif.*

Marketing—A basic marketing chart of the United States, originally prepared for its own clients, has been released by the Research Company of America. This chart records a wide variety of basic and important facts and figures for each state and geographic area. Figures reported include population; retail sales, income tax returns; distribution of families; age groups, tenure status; housing facilities and equipment and other matters.—*Research Co. of America, 314 Madison Ave., New York, N. Y.*

Pump Data—A 256 page engineering handbook containing all data required for the solution of most problems, written in simple language, is now available. —*Economy Pumps, Inc., Hamilton, Ohio.*

Steam Hose—Containing a simple, easy to read set of rules for the care and maintenance of steam hose, as well as detailed instructions on the proper method to attach couplings, a revised catalog section on The B. F. Goodrich Co. Data on inside and outside diameters, weight and number of plies also are listed.—*The B. F. Goodrich Co., Akron, Ohio.*

Shakeouts—A handsomely illustrated 8-page bulletin on its new full floating foundry shakeouts has just been issued by the Robins Conveying Belt Co. The booklet undertakes to explain vital features of the company's product and sets it apart from others, and the various advantages of using the various types, both non-discharging and self-discharging types.—*Robins Conveying Belt Co., Passaic, N. J.*

Doors—Byrne Doors, Inc. has just issued a new booklet describing its efforts to replace war-needed steel with wood for use in large doors for airplane hangars and factory installations. The booklet contains blueprint drawings of typical installations showing control stations and other features.—*Byrne Doors, Inc.*, 1150 *Griswold St., Detroit, Mich.*

Paints—Again emphasizing the growing appreciation of the important function of paint during wartime, the third issue of "Paint Progress," published by

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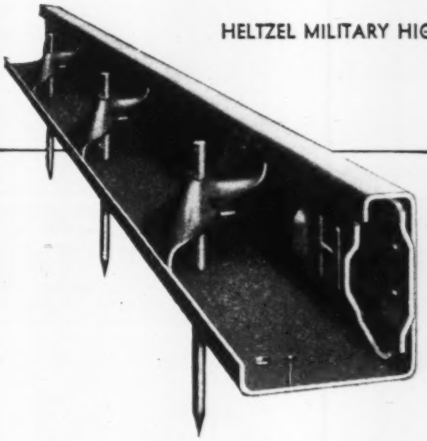

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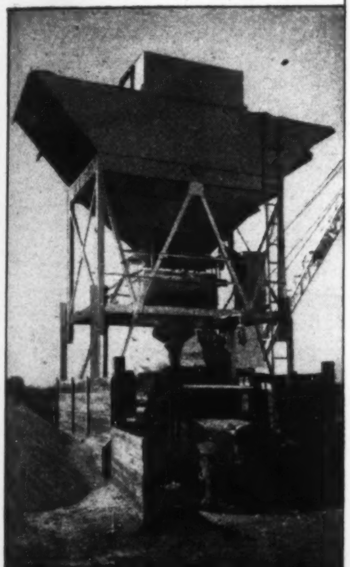
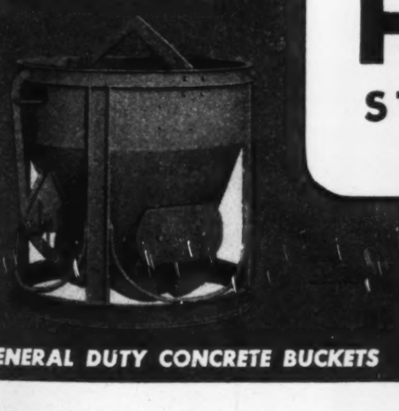


OTHER HELTZEL COST SAVING EQUIPMENT . . .



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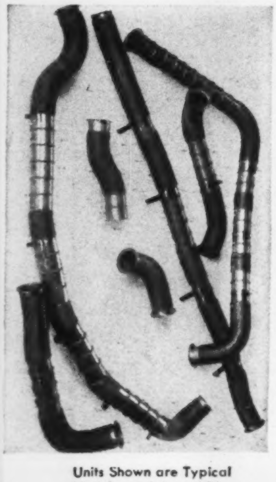
REX *Flexible* METAL HOSE



Units Shown are Typical Vari-formed Assemblies.

The many production types of REX Flexible Metal Hose offer the widest range of adaptability—for simplifying re-design problems where space limitations and flexibility are imperative—for conserving more critical materials—for solving every kind of fluid and gas handling problem.

REX Flexible Metal Hose speeds manufacture by facilitating assembly. It can be bent to position or "snaked" into place and coupled in a fraction of the time required to fit multi-plane pipe connection. Easily attached fittings for every requirement. REX Flexible Metal Hose withstands severe flexing and vibration. All in the interest of war time economy.

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General Offices: MAYWOOD, ILLINOIS
Factories: Maywood and Elgin, Ill.

the New Jersey Zinc Co., takes up subjects such as painting for dimout purposes, for war plant lighting, for the protection of bombs and for the conservation of wood and metal.—*New Jersey Zinc Co., 160 Front St., New York, N. Y.*

Equipment—A new 24 page picture book "Whiting Products for Industry" just published gives a complete comprehensive picture of Whiting service to industry with condensed but pertinent facts on the various product lines—including cranes, railroad and aviation equipment, cupolas and foundry equipment, Quickwork products, Swenson evaporators and filters, and other special Whiting equipment for heavy industries. —*Whiting Corp., Harvey, Ill.*

Redwood—Representing a highly specialized use for which redwood is said to be ideally suited, the subject matter of a new data sheet released by the California Redwood Association deals with "Reservoir Roofs." Featuring a double-page spread of sketches and various construction details of the Walpert Street Reservoir at Hayward, Calif., the four page bulletin points out that Redwood combines the physical and mechanical properties that are essential for good reservoir roof construction.—*The California Redwood Association,* 405 *Montgomery St., San Francisco, Cal.*

Plywood—"Technique of Plywood" by Charles B. Norris, has been brought out in a second edition by the I. F. Laucks, Inc. The new edition contains in its addenda chapter on "Strength and Deflection of Douglas Fir Plywood Under Loads Applied at Right Angles to Face," and a chapter on "General Scientific Principles of Gluing." Thirty other chapters in the main section take up other facets of the plywood industry.—*I. F. Laucks, Inc., Seattle, Wash.*

Air Brush—A new booklet, FM9-42, describing the manual airpainting equipment manufactured by the Paasche Airbrush Co. has just been issued.—*Paasche Airbrush Co., Chicago, Ill.*

Lighting—The National Transformer Corp. has just issued an 8-page folder "Facts to Help You Plan Better Wartime Fluorescent Lighting." Illustrated in color with photographs, drawings and diagrams, the booklet explains the important place that cold cathode fluorescent illumination is now taking in war plants throughout the country. It covers the new fluorescent development in nontechnical terms, except for a section especially planned for the engineer.—*National Transformer Corp.,* 224-232 *21st Ave., Paterson, N. J.*

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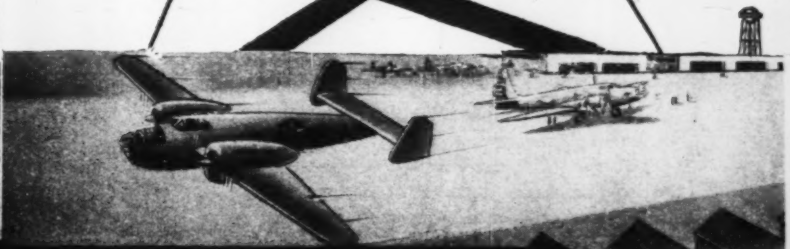

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MEN AND JOBS

D. B. McCrary, of Asheboro, N. C., recently was named acting chairman of the North Carolina Highway and Public Works Commission, to serve during the absence of Chairman **Ben Prince,** who recently was granted a leave of absence to accept a commission in the Army Ordnance Department. McCrary is commissioner for the Sixth North Carolina Highway District, and previously served as acting chairman of the commission for three months in 1941, prior to Prince's appointment.

George McCarthy has been named executive director of the New Britain, Conn., Housing Authority, succeeding **Louis W. Johnston,** who has been given a leave of absence to enter the U. S. Army.

William P. Kanto, a recent graduate of the North Carolina State College, with a degree in civil engineering, and formerly town manager at Apex, N. C., and Norton, Va., has been commissioned a lieutenant in the Army.

Capt. Richard L. Jones, for twenty years assistant inspector for the engineering department of the Milwaukee Sewerage Commission, and recently an executive officer of the Army Air Force Combat School at Smyrna, Tenn., has been promoted to the rank of major.

Col. Beverly C. Snow, a native of Durham, N. C., has been assigned to duty as commanding officer of Group 1 at the Engineer Replacement Training Center at Fort Belvoir, Va.

John K. Howard, of Goodwater, Ala., and **Ralston H. Robertson,** Bayou la Batra, Ala., has graduated from Engineers' Officers Candidate School and been commissioned second lieutenant.

Charles R. Cook, an employee of the U. S. Engineers at St. Petersburg, Fla., has been enlisted in the Navy construction battalion with a rating of chief petty officer.

Don S. Campbell, chief of the operations section of the Bonneville Power Administration, has been commissioned a lieutenant in the Naval Reserve, and is now on active duty. **Claude A. Miller,** Bonneville superintendent of transmission, has been made acting chief of the operations section.

James Clark, formerly of Clarkton, N. C., has accepted the position of sanitarian on the staff of the Vance County Health Department. He fills a vacancy

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FOR OPEN STEEL FLOORING

That scraper edge on the Bates open steel flooring cross bar is cleaner and safer. You grasp the idea from even a quick glance at the picture. Yet it doesn't cost you a cent more.

You get those extra advantages because the Bates patented process builds a fillet from displaced metal—in addition to the clean scraper tread of the "Hex" cross bar, giving you smoother, cleaner, larger welds *and stronger flooring.*

The whole process is explained—and many fine installations pictured—in the 8½ x 11 catalog, "FILLET-WELD BATES GRATES." Write for a copy.

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OPEN STEEL FLOORING • STAIR TREADS

WORLD CHAMPIONS
1½ TO 10" SIZES

Only JAEGER Pumps Have All These Features

- **JAEGER PRIMING JET** — Up to 5 times faster prime and re-prime — no adjustments, no need to "gun" engine.
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- **EVERY PUMP FACTORY TESTED** for high capacity and pressure.
- **COMPLETE RANGE OF SIZES, TYPES** — 3,000 to 220,000 g.p.h.

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This air-conditioning exhaust water tunnel was once a concrete sewer. The badly disintegrated walls (upper photo) were reconditioned with "GUNITE," ten years ago, and are still intact. Write us for specifications used on this job.

The "CEMENT GUN" can be bought by anyone, and used without restrictions.

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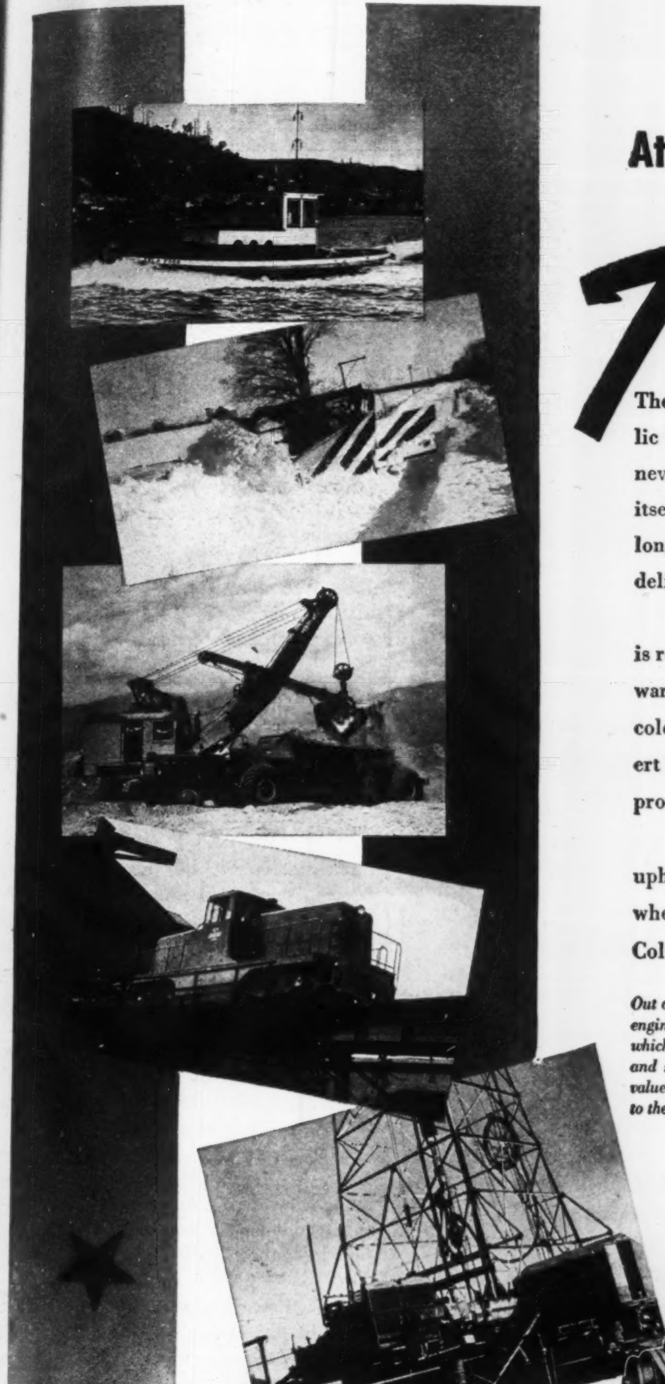
WE ARE ALSO "GUNITE" CONTRACTORS
LET US BID ON YOUR WORK



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The first Cummins high-speed Diesel was offered to the public in 1932. From that day to this, the Cummins Diesel has never asked for the easy jobs . . . but has consistently proved itself in the face of the longest odds . . . on the toughest, the longest and the hardest pulls . . . on the jobs which demand the delivery of an engine's full rated horsepower day after day.

Now, after a decade of conditioning, the Cummins Diesel is ready for action—*is in action*—on every front in this global war. Its quick starting has been tested in the sub-zero arctic cold. Its cool running has been demonstrated in flaming desert heat. Its simple, easy service and maintenance has been proved in the world's most inaccessible, out-of-the-way places.

In short, the Cummins Diesel has proved its ability to uphold the highest American tradition . . . to do its best job when the going is toughest. CUMMINS ENGINE COMPANY, Columbus, Indiana.

Out of the experiences of owners during the past 10 years—plus new tests which the engine is meeting daily—a newer and better Cummins Diesel is now building . . . one which will do your job at a lower cost, for a longer time, with fewer parts replacements and service requirements. When all-over economy again becomes the yardstick of value, this new Cummins Diesel will be your first choice. The new booklet, "Threshold to the Future" will tell you why. Ask for your copy.

Threshold to the Future

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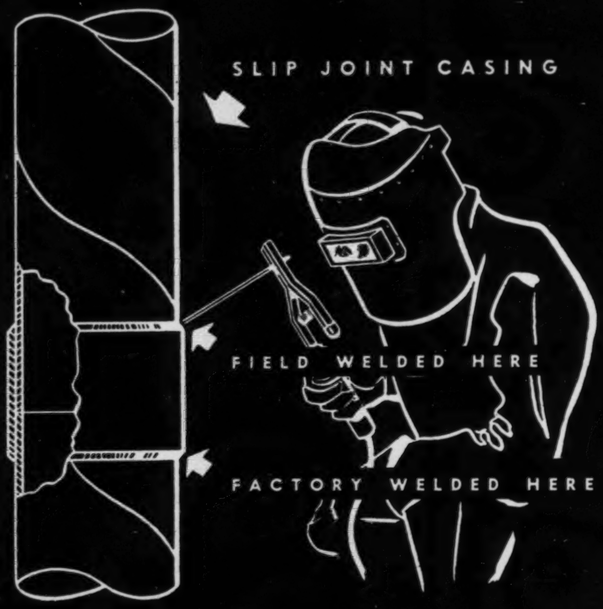


HERE'S 6" to 36" CASING For Wartime Water Wells

If you are sinking a well to meet wartime water problems, here is something you'll want to know: You can get a first-class job, and save time, labor and handling costs by using ARMCO Spiral Welded Casing.

This casing comes in diameters from 6 to 36 inches; wall thicknesses from 7/64 to ½-inch. You specify uniform lengths up to fifty feet that fit your drilling rig exactly. Field welding is quickly done without lineup jigs or clamps. Slip-joint collars facilitate alignment, and machine-faced ends assure utmost straightness

There are other advantages with ARMCO Casing. Tight, welded joints eliminate infiltration, keep the water free from contamination. Danger of collapse is greatly reduced, thanks to an exceptionally round cross-section (no flat spots) and the added strength imparted by the spiral bead of the weld.

Use ARMCO Spiral Welded Casing on that next water well. You'll like the way it saves time, labor and money. Write us for complete data and on-time delivery promises. The American Rolling Mill Co., Pipe Sales Division, 3411 Curtis Street, Middletown, Ohio.

ARMCO ARMCO

SPIRAL WELDED CASING

left when **W. Hall Brooks** resigned last summer to join the U. S. armed forces.

Wallace Screws, assistant building inspector at Atlanta, Ga., has joined the Navy.

Col. Richard Park, who has been assigned to Seattle to head the U. S. Engineers there under the new Pacific division set-up, took with him from Portland, Ore., five commissioned officers and two civilian engineers. They were: **Col. Herbert J. Wild**, Majors **Walter Church** and **William H. Baker**, **Capt. C. C. Templeton,** **Lieut. A. C. Catre**, and **B. I. Peterson** and **F. W. Allen.**

Ve Stephens, regional construction adviser for Region 8 of the Federal Public Housing Authority, was appointed city water superintendent at Fort Worth, Texas, last week. He is to fill the place left vacant by the recent death of L. A. Quigney.

James M. Ryant has been named the Mississippi State WPA administrator, succeeding the late Edward Gatlin.

Roger S. Myers, city engineer of Oxford, Miss., and formerly connected with the Mississippi State Highway Commission, has been commissioned a lieutenant in the U. S. Navy.

A. D. Newman, for seventeen years a Portland realtor, has been named war housing center director, and **Alfred W. Isom,** former acting Oregon manager for the Home Owners' Loan Corp., will be regional HOLC manager's representative in Portland, Oregon.

D. A. Somdal, of the firm of Neild, Somdal and Neild, architects and engineers, has been commissioned a lieutenant in the United States Navy.

Maj. Williams Alexander has been named resident engineer in charge of construction on a new air force installation in Idaho.

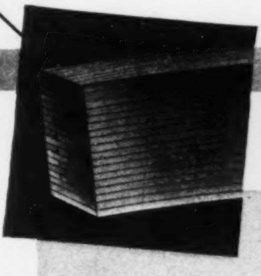
Neil W. French, engineer and sales manager of the West Virginia Steel Corporation at Charleston, W. Va., has been commissioned a lieutenant commander in the Civil Engineer Corps, U. S. Navy Reserve.

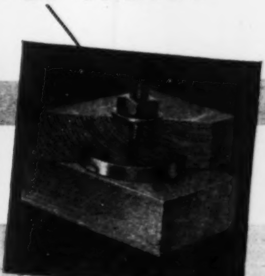
Harold J. Flannery has been appointed city engineer for San Jose, Calif., to replace the late William L. Popp.

Lt. Col. Joseph E. Gill, executive assistant to the U. S. District Engineer at Louisville, Ky., has been transferred to the Cincinnati engineer's office.

Modern Structural Members For Your Next Job

Lumber + Glued Lamination + Teco Connectors give you any type of beam, arch or truss!





New methods of joining lumber make available to architect and engineer, modern factory fabricated structural members engineered for specific jobs.

Teco Connected Trusses are made for spans up to 100 feet and more. The Teco Connector makes it possible to utilize 80% or more of the working strength of lumber, with a consequent reduction in the size of timbers. Teco metal connectors effect a significant saving in steel by eliminating the use of heavy gusset plates, bolts and rods.

Glued Lamination has changed all former concepts of joining and using timber framing members. Carefully selected kiln dried and seasoned lumber is built-up, shaped, formed and securely and permanently bonded with modern structural glues, into strong, graceful roof supports or structural members that are continuous from foundation to roof peak.

Post-free spans up to 200 feet and over are being built with glued laminated beam arches. Ply beams are being used in flat roof structures of one and two stories. They require no enclosing and lend themselves to unusual finishes.

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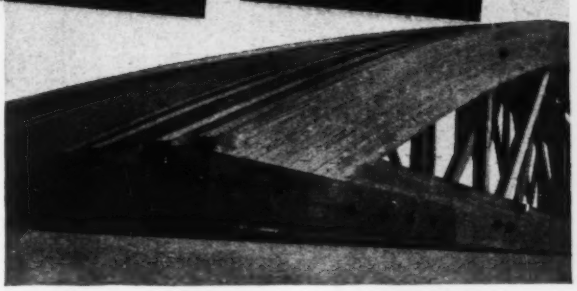
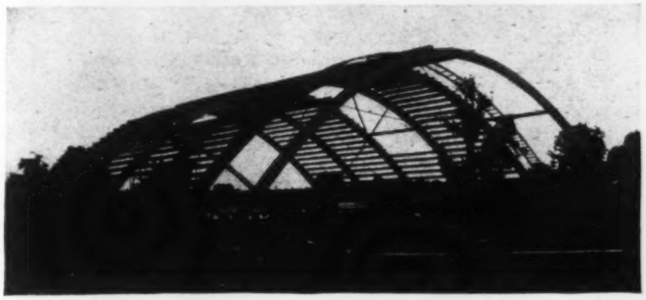
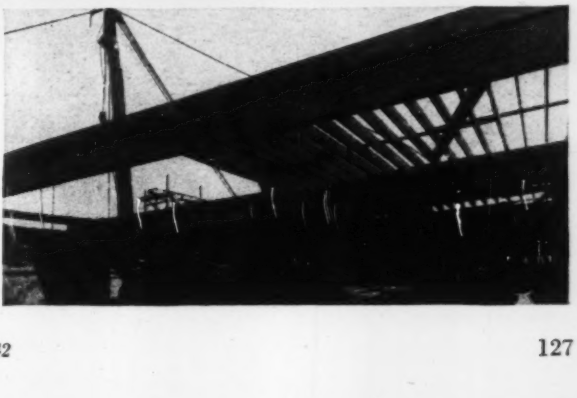
First National Bank Building **Saint Paul, Minnesota**



Typical Glued Laminated Bowstring Trusses, Teco Connected.



At Left — Roller Skating Rink, York, Pa. Glued Laminated Parabolic Beam Arches, span 90 ft.



Below — Coca-Cola Bottling Works, Albert Lea, Minnesota. Glued Laminated Ply Beams used in flat roof span 65 feet.

BALDERSON SNOW PLOWS

HELP KEEP ALASKA-BOUND WINTER TRAFFIC MOVING

Built to Operate With "Caterpillar" Diesel Tractors, They're Veteran Snow Fighters!

Proud to have an opportunity to help smash the Axis, a fleet of Balderson Snow Plows is on duty to lend a hand in keeping the vital Alcan Highway open for traffic this winter.

Balderson Snow Plows are veterans at handling tough snow removal jobs. They've been in use for many years throughout the entire snowbelt of the United States and Canada, and they'll make a good account of themselves on this new all-important project. These plows have the twofold advantage over other types of snow plows in being light in weight, yet amply sturdy for heavy snow clearing, and for bucking deep drifts. The secret of their success is in their design—"snow streamed" to move the greatest amount of snow with the least effort. Ruggedly built with strong box-type construction, Balderson Plows are electric welded.

"Caterpillar" Dealers—the world's most complete sales-and-service organization—handle the Balderson line. After Victory is won for America, and her allies, we will be able again to fill the demands of non-military users for these capable snow fighters.

Balderson
SNOW PLOWS
MANUFACTURING CO.
WAMEGO, KANSAS

MEETINGS

Associated Equipment Distributors, 24th annual meeting, Edgewater-Beach Hotel, Chicago, Ill., Jan. 11-13.

Canadian Construction Association, 25th annual convention. Important meeting. Seignory Club, near Montreal, Jan. 20-22.

American Society of Civil Engineers, annual meeting, Society headquarters, New York, N. Y., Jan. 20-22, 1943.

Regional and Local Meeting

Colorado Society of Engineers, 27th annual meeting, Shirley-Savoy Hotel, Denver, January 8th and 9th.

Constructors Association of Western Pennsylvania, 9th annual meeting and dinner, William Penn Hotel, Pittsburgh, Pa., Feb. 4.

Association of Highway Officials of North Atlantic States, Highway Problems Conference, Hotel Pennsylvania, New York, N. Y., Feb. 17-19, 1943.

Elections and Activities

Ernest B. Black, of Kansas City, Mo., president of the American Society of Civil Engineers, told the Iowa section, in Des Moines, recently that civil engineers should "work on the same basis" as soldiers. "If we really want to support the boys we ought not to go on a 40-hour week," President Black said. "What would we think of the Army and Navy going on a 40-hour fighting week?"

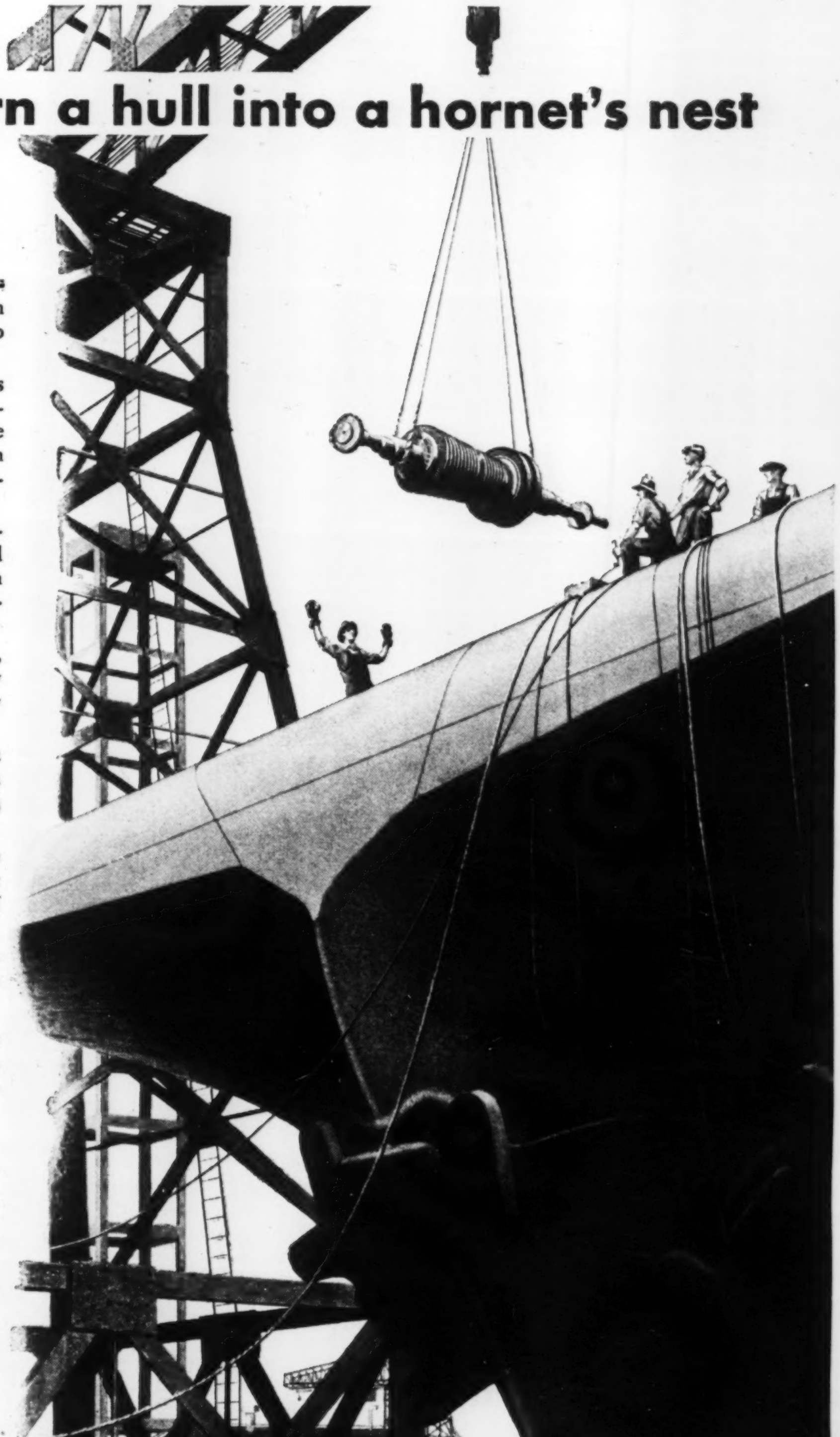
O. W. Crowley, secretary of the A.G.C. of Iowa, also was a speaker.

Raymond Zack, Mason City, Iowa, was elected president of the section. Other officers were: L. C. Crawford, Iowa City, vice-president; L. W. Malone, Des Moines, director; and L. O. Stewart, Ames, secretary-treasurer.

James B. Woodyatt has been elected first vice-president of the McGill Graduate Society. Mr. Woodyatt, a civil engineer, and a graduate of McGill in 1907, is now president of the Sherbrooke Railway & Power Co., and a vice-president and general manager of the Power Corporation of Canada, Ltd.

Members of the Louisiana Section of the American Society of Civil Engineers recently entertained J. T. L. McNew, Head

How to turn a hull into a hornet's nest



THE EFFICIENCY of an aircraft carrier depends upon power—steam power to propel it, electric power to operate it.

Powering these sea-going airfields is a typically *Westinghouse* kind of wartime job. It is a job that calls for the thousand and one different skills in things electrical that are second nature to Westinghouse.

Here is just a small part of the equipment that Westinghouse has designed and built especially to make American carriers outstanding engines of destruction:

- ★ Steam turbines, compact in size, yet so powerful they drive our new carriers *faster* than any enemy carrier afloat.
- ★ Elevators big enough to hold a bomber, fast enough to deliver a plane to the deck with minimum delay.
- ★ Generators on each ship capable of producing enough electric power to light a city the size of Seattle.
- ★ Intricate radio equipment specially designed to stand up under the shock of battle.

Westinghouse "know how" is being applied—not only to aircraft carriers—but to nearly every type of ship in our Navy.

In this, as in all phases of Westinghouse wartime activity, the long-range work of our Research and Engineering Laboratories has played a significant part. Discoveries in many fields are now bearing fruit in the production of better and more powerful weapons of war.

Many of these discoveries, we believe, will someday help to make a better peacetime world.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. Plants in 25 cities; offices everywhere.

This advertisement has been reviewed by Government authorities and contains no information of military value to the enemy.

Westinghouse

... making Electricity work for Victory

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KEEP 'EM POURING

Use

SOLVAY Calcium Chloride

IN THIS WINTER'S CONCRETE!

Get Extra Safety
Extra Speed
Extra Quality

War-time winter concreting operations call for speed—*but not at the sacrifice of quality or safety!* To obtain extra speed . . . and at the same time, added protection, added safety and added quality, use Solvay Calcium Chloride.

Saves on finishing, forms, protection costs and labor. Does not change normal chemical action of Portland cements!

use **SOLVAY**
CALCIUM CHLORIDE
with all
PORTLAND CEMENTS

SOLVAY SALES CORPORATION
40 Rector Street New York, N. Y.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

of the Engineering Department of Texas Agriculture and Mechanical College, at a regular meeting. Mr. McNew spoke briefly at the meeting. Life memberships in the national society were conferred at the meeting on John Birger Lindhe, coast and geodetic survey, New Orleans; Farrar Patric Hamilton, war production board, New Orleans, and Jacob Thompson Bullen, superintendent of public works, Baton Rouge.

J. S. KENNEDY of Akron, president of the Ohio Society of Professional Engineers, spoke before the Mahoning Valley Chapter of the Society, at a recent meeting at Youngstown. Mr. Kennedy urged engineers to take a more active part in public life, as part of a talk on "The Engineer as a Professional Man."

THE CENTRAL BRANCH of the Associated General Contractors of America, and the Master Builders Association held a joint convention at Des Moines, Iowa, Dec. 17 and 18.

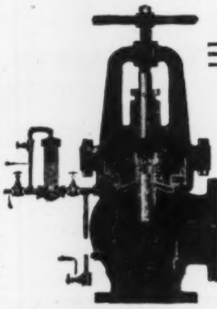
THE Northern Lumbermen's Association will hold its annual convention at Minneapolis, Minn., Jan. 19-20.

THE CENTRAL ILLINOIS Section of the American Society of Civil Engineers met in regular session recently at Chicago to hear a talk by E. B. Witzman, manager of the Springfield Office of the Illinois Bell Telephone Company. C. M. Hathaway, engineer of construction of the state division of highways, and past president of the section, presented a certificate of life membership in the A.S.C.E. to Walter J. Gearhart, a member of the section, in token of his 35 years of active membership.

PURDUE University's annual road school will be held in January over a three-day period instead of the usual five days, with special entertainment eliminated and night sessions held instead. The school is again under the direction of Captain Ben H. Petty of the Purdue Staff.

ELECTION of four new members to the Board of Trustees of the Industrial Hygiene Foundation, which recently held its seventh annual meeting at Mellon Institute, Pittsburgh, has been announced. New members are: Ned H. Dearborn, executive vice-president, National Safety Council; Professor Philip Drinker, Harvard School of Public Health; Lt. Col. A. J. Lanza, M.C., chief, Occupational Hygiene Branch, U. S. Army; Dr. C. B. Selby, medical consultant, General Motors Corporation.

RAYMOND M. FULLER, consulting engineer, was recently elected president of the Philadelphia Chapter, Pennsylvania Society of Professional Engineers.



TRIPLE ACTING NON-RETURN VALVE

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This valve will automatically cut in a boiler whenever its pressure equals line-header pressure; it will isolate a boiler automatically whenever its pressure, from any cause, is lower than line-header pressure; and it will prevent steam flow from the boiler in event of sudden drop of line-header pressure below the boiler pressure, by means of differential shot pilot valve functioning.

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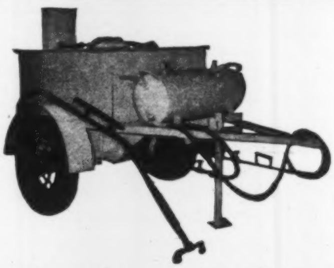
Furnished in angle, globe and elbow patterns, sizes 2½" to 12", also available in larger sizes, as well as in the Cross pattern.

Write for Specifications

GOLDEN-ANDERSON VALVE SPECIALTY CO.
Fulton Building Pittsburgh, Pa.



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for Case DI Tractors

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for Stone and Sand

ASPHALT PLANTS
Portable — Stationary

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White Mfg. Co.
ELKHART INDIANA

Pumping Station — Mississippi 25' deep in clay and sand—20' of water handled perfectly by Moretrench Wellpoint Equipment.

One we missed-

As far as we know there were no MORETRENCH WELLPOINT SYSTEMS used on the Alcan Highway so without self-consciousness we can take off our hat to the men and equipment who made this truly great achievement possible.

Call on us when foundations go deep, and ground water is at the surface . . . when you want to be *sure* that your job will go ahead without delay—IN THE DRY! We've got what it takes to turn wet ones into dry ones practically overnight!

- After January 1, 1943, our mid-western warehouse will be at 3037 Christiana Ave., Chicago, Illinois.

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90 WEST STREET, NEW YORK

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QUALITY PRODUCTS SINCE 1908
R-S
Streamlined

Uniform Pressure Obtained in Inaccessible Line

Uniform pressure is obtained on the downstream side of an R-S Butterfly Valve in an inaccessible line by means of an extended reach rod and an electric motor. The declutching unit and hand wheel control is used when the power fails. Can be powered by an air diaphragm motor or hydraulic cylinder.

As the illustration indicates, the beveled vane closes naturally against the body of the valve and at the correct angle for the wedge-tight shut-off of any material that flows or is forced through a pipe. Machined to exceptionally close tolerances.

Streamlined construction induces self-cleaning. Maintenance is no problem—constructed to last for years. Sizes to 84-inches and pressures to 600 pounds.

Write for catalog, approximate weights and detailed dimensions.

BUTTERFLY VALVE DIVISION
R-S PRODUCTS CORPORATION
116 Berkley Street Philadelphia, Pa.

R-S Streamlined BUTTERFLY VALVES

TRENDS IN THE NEWS

Recommended Building Code For New Dwellings

In a report entitled "Recommended Building Code Requirements for New Dwelling Construction With Special Reference to War Housing", just issued, a representative committee drawn from the Federal agencies most concerned with housing, presents its recommendations for improved requirements.

Building code requirements are frequently criticized on the ground that they call for excessive amounts of materials and discourage the introduction of new methods of construction. Such criticism is pointless, said the committee, unless improved requirements can be offered that will have the effect of correcting the conditions mentioned.

Building code requirements can be legally effective only when they call for the minimum that is necessary for safety and health. This places such requirements in a different class from other standards, which properly take into consideration expected life, comfort, livability, good taste, and other matters that are socially and economically desirable but cannot be legally required. An appreciation of this distinction should help to clear up some of the confusion that exists regarding apparent inconsistencies between building standards and building code requirements.

The recommended requirements contained in the report apply to single- and two-family houses and to multiple dwellings of limited height, and cover such matters as fire resistance, light and ventilation, exits, strength of construction, and chimneys and fireplaces. In general, good practice is required, certain well-recognized standards and specifications being cited as acceptable evidence of good practice. Specific dimensions and other details are given where necessary. The intent is to assure safety and health and at the same time to permit the greatest possible flexibility in design and construction.

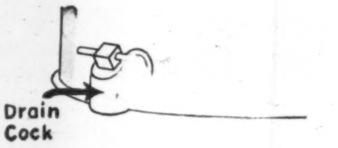
The committee recognizes that emergency conditions limit the availability of certain materials, require stringent economy in the use of others, and make the use of substi-

How to make Acetylene Generators last longer and work more efficiently...

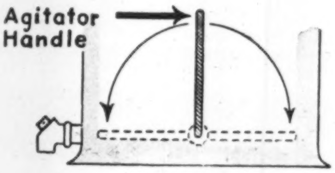
Acetylene generators are a convenient and economical source of acetylene gas for use in the oxy-acetylene process. When operated and maintained in accordance with the manufacturer's instructions, a good generator should function safely and efficiently indefinitely. A few suggestions are outlined here to help you keep your generator working its best for a long time.

WHEN RECHARGING

1. *Always change the water* whenever a generator is to be recharged, and replace it with clean, cool, water. This will guard against a rise in temperature within the generator to an abnormal level that would affect the safety and efficiency of operation.

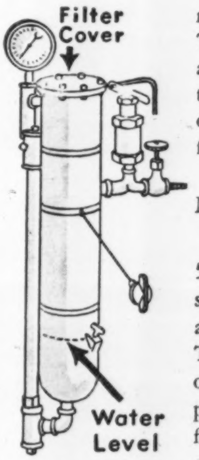


2. *Operate the residue agitator* while draining the generating chamber. This will help assure thorough removal of the residue.



3. *Flush the generating chamber* with clean water after draining off all the residue. If this is not done, the lime deposit will build up so that the amount of water that can be put into the generating chamber is considerably reduced. In addition, the caked deposit will make difficult operation of the residue agitator, and will slow up recharging by partially plugging the drain cock.

4. *Check the hydraulic* water level each time the generator is recharged, and add water to the correct level if needed. This is important to assure protection to the generator in case of a flashback of flame.



MAINTENANCE SUGGESTIONS

5. *Clean filter pads* should be installed at regular intervals. This is necessary not only because dirty pads may restrict the flow of acetylene, but also because they permit entrained moisture and small particles of lime to be carried over into the hose and apparatus.

6. *Test for leaks* with soapy water at periodic intervals, particularly around gaskets—and always immediately after a gasket has been replaced. This is important not only because leaks represent a serious hazard, but also because gas leaks are costly.

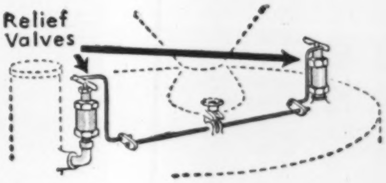
7. *Prevent rust* on the outside of the generator by painting it or touching up bare spots whenever needed

FOR SAFETY'S SAKE

8. *Prevent freezing* of water in any part of the generator, as freezing may destroy its usefulness and will in many cases present serious hazards. The book illustrated here will help you to do this. Copies may be obtained from any Linde Office, without charge.

COLD WEATHER CARE OF ACETYLENE GENERATING AND DISTRIBUTING EQUIPMENT

9. *Relief valves* should be kept in good operating condition at all times, and set to release at the pressures recommended by the manufacturer.



10. *Do not remove* permanently any part of the generator mechanism. Each part is specifically designed to help assure safe and efficient operation.

11. *Follow all instructions* furnished with the generator. Duplicate instruction books for all Oxweld generators can be obtained from any Linde office without charge.

FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York, N. Y. UCC Offices in Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

You Can Obtain Copies of this Advertisement For Distribution in Your Shops . . . or to Post on Your Bulletin Boards . . . Upon Request.

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BROTHER, THIS IS WAR

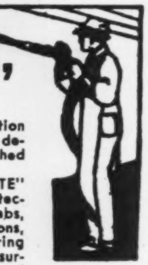
Lives depend on war jobs . . clean, snappy, no-blot drawings are vital

USE THE BEST!

Lives are more important than pennies – the way to save lives in this war is to *speed production.* Clean, snappy blueprints help . . . they keep production going top speed. Use Arkwright Tracing Cloth. This strong, uniform, specially-processed cloth is built for accurate, high-speed production. Run Arkwright through the blueprint machine time after time – it doesn't tear, fray or curl. Don't risk vital war drawings with tracing cloth that may become brittle or opaque with age. Arkwright permanency is an inexpensive guarantee of perfect work. Specify it next time. Arkwright Finishing Company, Providence, Rhode Island.

Arkwright TRACING CLOTHS

AMERICA'S STANDARD FOR OVER 20 YEARS



"GUNITE"

can reduce your construction costs. It is efficient and dependable, an established product.
WE RECOMMEND "GUNITE" for structural steel protection, floor and roof slabs, thin exterior walls, partitions, tanks, reservoirs, restoring disintegrated concrete surfaces, repairing reinforced concrete, etc. Let us suggest how "Gunite" can best solve your problems.

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"GUNITE" CONTRACTORS
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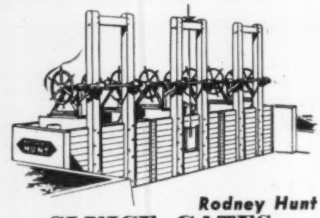

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SLUICE GATES
Are you interested in metal or timber sluice gates? Also hoists, stands or other water controlling apparatus? Rodney Hunt has over 100 years' experience making this type of equipment.
Write for special catalog today.
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tutes necessary in some cases. However, the committee has not considered it practicable to write building code requirements in terms of a severely restricted list of materials based on temporary shortages nor to suggest details about substitutes in the code itself. Such matters are covered more flexibly and efficiently by general code provisions, supplemented by regulations that can be put into effect or withdrawn in accordance with fluctuating conditions. The subjects of new materials and methods of construction are treated in a general way, providing for their acceptance on submittal of satisfactory evidence that they are suitable. In order to conserve space in the code itself and to widen the field of choice of materials and methods, the report contains an appendix giving information on various acceptable ways of meeting specific code requirements and references to source material.

The report, which is designated as BM388, is recommended to those seeking the advice of Federal agencies as to proper building code requirements in areas not now having such requirements. It is also offered for consideration wherever local building codes are being adopted or revised. It is believed that such a document can provide a continuing service through which the experience of Federal agencies and the results of Federal research can be made continuously available to local governmental authorities. Periodical revision is planned; and criticism and suggestions for improvement are invited. Copies of the report are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 20 cents.

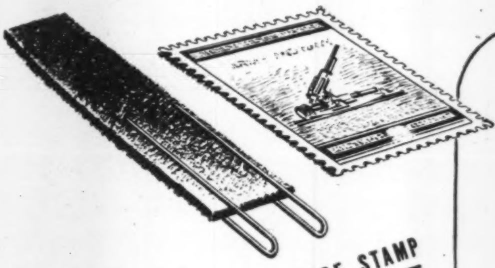
• • •

County Road Boards Asked to Sell Equipment

Highway and maintenance in the South will have to go back to the pick and shovel stage according to an announcement made recently by Forrest Armstrong, regional manager of the War Production Board's construction machinery branch in Atlanta, who called on counties to turn over all power equipment.

Armstrong said WPB expects to locate some 150,000 steamshovels, bulldozers, crawler tractors and other

A Revolutionary Method of determining Stress Distribution



LITTLE LARGER THAN A POSTAGE STAMP

SR-4

STRAIN GAGE

SR-4 Strain Gages are the simplest gages ever built to make stress-strain distribution tests in indeterminate structures. Little larger than a postage stamp—and just as easy to affix—the SR-4's principal applications are in airplanes, railroad equipment, bridges, dams, moving parts in machinery—yet it is readily adaptable to a wide variety of other structures and equipment.

Used in conjunction with Baldwin Southwark indicating and recording equipment, SR-4 Strain Gages are particularly suited for determining stress distribution in machinery operating at high loads. They are also used extensively in airplane manufacture for flight tests and for static tests of the complete plane.

Commercial applications have been made which demonstrate the successful application of SR-4 Strain Gages for recording static and dynamic stresses in tension, torsion, compression, flexing, and impact. Stresses in gun barrels during firing, impact forces produced by a projectile, and high velocity fluid pressure changes are other applications of the SR-4. It has also been used on power and torque meters and on variable resistance rheostats without sliding contacts.

Write today to Dept. 1029 for the new SR-4 Strain Gage Application Booklet No. 171 which features the six standard gage types now available.

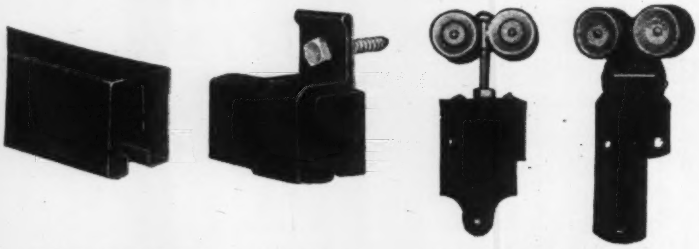
BLW THE BALDWIN GROUP

BALDWIN SOUTHWARK

Division **THE BALDWIN LOCOMOTIVE WORKS,** *Philadelphia, Pa.*

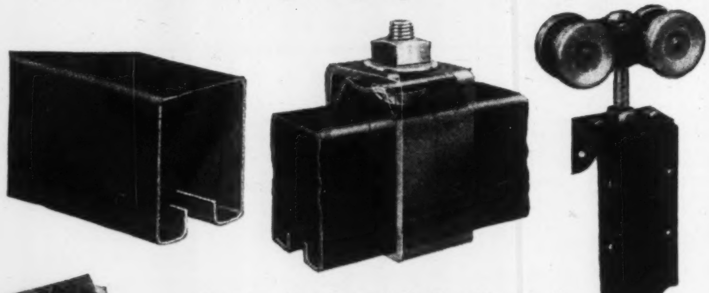
STANLEY HARDWARE
for Rolling or Sliding Doors

FOR DOORS weighing up to 350 pounds



FOR DOORS weighing up to 700 pounds

FOR DOORS weighing up to 1000 pounds



Stanley Hardware Catalog No. 61 describes the full line. Send for a copy. The Stanley Works, New Britain, Connecticut.

STANLEY
TRADE MARK
HARDWARE FOR CAREFREE DOORS

FASTER • BETTER • STRONGER
HYDRO-TITE FOR BELL & SPIGOT PIPE JOINTING

Hydro-Tite is a dependable self-caulking sulphur-base compound for jointing water mains and soil pipe—costing less than lead—requiring no skill to make tight joints. Same crew can lay more pipe per day. Stands deflection and vibration. In use 30 years without failure.

Write for Jointing Book.

HYDRAULIC DEVELOPMENT CORP.
50 CHURCH STREET — NEW YORK, N. Y.

earth-hauling equipment valued at $300,000,000 in the states of Arkansas, Georgia, Tennessee, Mississippi, Alabama, Florida and the Carolinas alone.

"The WPB is appealing to highway commissioners of all counties and cities and states to sell such equipment voluntarily, he declared, explaining it would then be unnecessary to use the requisitioning powers of the War Production Board to take the equipment away from its owners."

Several counties have already sold their equipment, Armstrong said, among them Madison County, Alabama, which disposed of 16 units of equipment. He said the Alcan and South American highways are among the projects for which the heavy equipment is needed although much of it will go to Russia, Ireland or the Pacific sector to speed construction of roads, airports and bases. He added the WPB would call on every city and county in the Southeast and that they should get their roads in shape for the duration while power-driven units are still available.

• • •

Wood Manhole Lids Fill Wartime Need

Wooden manhole covers are helping war booming communities solve a problem posed when the War Production Board banned the ordinary iron variety.

First tried by Los Angeles County, California, the wooden manhole covers built of solid timbers specially treated with a salt preservative to resist termites and decay, have proved highly successful.

The WPB order was designed to save the 500 lbs. of critical metal that normally goes into each cast iron installation—250 lbs. in the lid and 250 lbs. in the frame. Some cities already have experienced delays in the installation of sewage facilities for war housing projects due to a shortage of metal manhole covers.

The Los Angeles County surveyor's office developed the wooden substitutes and Surveyor Alfred Jones asserts the idea is suitable for city and county use throughout the nation.

These wooden lids may be constructed in either circular or hexagonal design by laminating short lengths of plank. They may be built in local wood-working shops without

FOR VICTORY
BUY UNITED STATES WAR BONDS AND STAMPS
THROW YOUR SCRAP INTO THE FIGHT
YOUNGSTOWN

Minute men to arouse sleeping Scrap . . . . .

Steel salesmen, along with the salesmen of all other industries, are the Minute Men of 1943. Their task is to arouse dormant scrap—in your plant, in every shop they can reach.

Be on the alert for this modern Minute Man's urgent call. His job is threefold:

1. To remind you of the objectives of the WPB Dormant Scrap Drive and enlist your scrap.
2. To help you determine what may be considered dormant scrap.
3. To help you start your dormant scrap on its way to hungry steel furnaces.

So long as an enemy is in the field, scrap need will be critical. The Minute Men are pledged to help you keep it rolling for the duration.

25-428

THIS ADVERTISEMENT SPONSORED BY

THE YOUNGSTOWN SHEET AND TUBE CO.

Youngstown, Ohio

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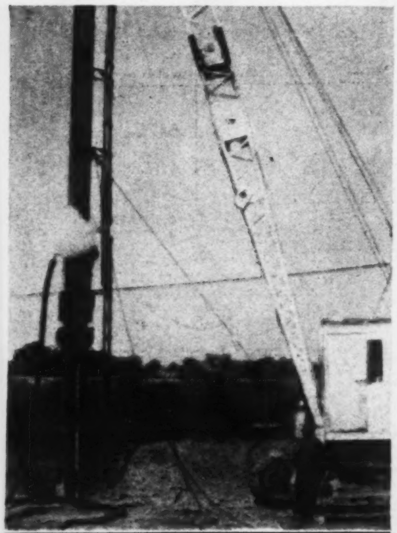
SUPER-VULCAN
OPEN TYPE
Differential Acting
PILE HAMMERS
18C-30C-50C and 80C
☆

Cut time - -
costs - - effort
-- DO IT NOW --

You get more penetration per minute as each pile goes down—twice the blows per minute does the job. Each blow takes but one quarter to one third the steam. Things to consider are the rugged strength, positive action, and compactness. The open type fits the same leads and uses the same accessories as the VULCAN single-acting Pile Hammers.

WRITE FOR BULLETINS.



VULCAN IRON WORKS
Since 1852
331 North Bell Avenue
Chicago Illinois

extensive fabricating equipment. Tests show that the pressure-treated wooden covers have ample strength and durability.

• • •

Registration of Engineers Being Urged

Following recent increases in demand for technically-trained personnel, the National Roster of Scientific and Specialized Personnel are urging senior and graduate students in engineering, and other specialized fields to register their skills. The principal national professional and scientific societies are constantly cooperating with the National Roster to stimulate complete registration in their respective fields.

The National Roster, a part of the War Manpower Commission, now has listed and punch-card-indexed approximately 550,000 names in more than 60 specialized occupations. The Roster is a compilation of the nation's technical manpower resources, for such use as the critical war emergency may demand. It includes the most recent college graduates in various scientific courses. Constant efforts, moreover, are made to list all people with technical training, even though their skills may not have been used in recent years.

Registration with the Roster is not to be considered application for employment. Many who have filled out the questionnaires are now at work in their chosen professions. Many of those registered have received offers of employment. Acceptance of such offers is optional with each individual registrant. In the past twenty months 140,000 men and women have been referred to prospective employers of specialized personnel, particularly for war production and research. Methods will shortly be inaugurated whereby the Roster will maintain a check on the results of its recommendations.

The overall information of the Roster is used as a basis to determine shortages in any technical field.

To register with the Roster, a man or woman with scientific or other specialized training should write to Dr. Leonard Carmichael, Director, National Roster of Scientific and Specialized Personnel, War Manpower Commission, Washington, D. C., mentioning the field or fields in which he or she has training or knowledge.

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SEATTLE, U.S.A.
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Longest wooden trusses in world were installed with ONE 5-Ton Beebe after power hoists proved impractical.
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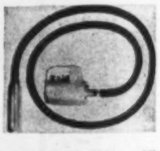

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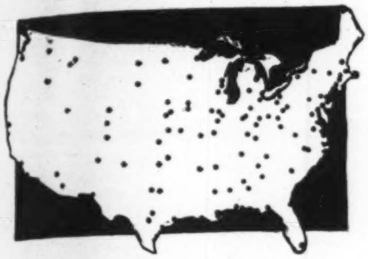
BURBANK, CALIFORNIA

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York
ELSIE EAVES, Manager *SCOTT McLEOD, Statistician*
(Daily service also available—Write for details)

Location of ENR Correspondents



Symbols and Abbreviations Include

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect — Engineer-Management type of contract.

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges, Grade Cross'gs
Streets & Roads
Earthwork, Waterways
Unclassified
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Note: To comply with censorship requirements, addresses on some reports are being generalized. Data which would reveal the purpose of the improvements and the size are withheld. The name of contractor and general area are reported.

WATER SUPPLY

PROPOSED WORK

†Texas—U. S. Eng., Fort Sam Houston, water supply lines, facilities, Bell Co. $15,000.

Tex., Gladewater—City, addnl. water lines, sanitary sewer lines, etc. Over $15,000.

Tex., Grand Prairie—G. H. Turner, mayor, imprv. WW sys., Dalworth Park. About $15,000.

†Utah, Layton—Town, c/o Town Clerk, WW sys., addn. 500,000 gal. concrete reservoir, installing 19,700 ft. 16 and 10 in. steel pipe. $88,000. **FWA.** Caldwell & Richards, Templeton Bldg., Salt Lake City, engrs.

Utah, Salt Lake City—Geo. D. Keyser, comr. for Water Dpt., reservoir on Beck St., reservoir and wells at City Creek Canyon, $58,000.

†Wash., Oak Harbor — Federal Works Agency, Alaska Bldg., Seattle, 10 in. cased, drilled well, equip., connecting lines, Project 45-227. $22,700.

Wis., Waupun—State Dpt. P. Welfare, Madison, new well addnl. water supply, State Prison. $70,000. R. C. Kirchoff, Madison, state archt.

Wis., Winnebago—State Dpt. Pub. Welfare, Madison, water supply changes, State Hospital. R. C. Kirchoff, Madison, state archt.

Alta., Dodds—Deep well, imprv. water sys.

N. B., Devon—Municipality, c/o A. Coombes, mayor, artesian wells and other work, also automatic spiral pump. $20,000.

N. B., Moncton—Swift Canadian Co., Ltd., Moncton, watermains, etc. $15,000.

Ont., Sudbury—H. P. McKeown, municipality clk., rejected bids 1 story, brick, steel pump house, concrete fdn., also reconstructing David St. pump house. $60,000. CD 5/5—ENR 5/7.

BIDS ASKED

†Md., Glen Burnie—Anne Arundel Co. Sanitary Comm., Glen Burnie, rejected bids Dec. 9, supplemental water supply line, Contr. 15W, W.P.W. Md. 18-141. **FWA.** Plans deposit $20. CD 11/19—ENR 11/26.

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, water transportation and receiving station for water supply, Calhoun Co. Over $15,000. Plans deposit $25.

LOW BIDDERS

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, Dec. 4, 500,000 gal. water reservoir and modification of pump. installations, Inv. 43-199, from L. T. Favret, 937 Gravier St., New Orleans.

Mich., Battle Creek — City, WW imprvs. Contr. 2, Verona, and Goguac Pump Stas., from Birmingham Contg. Co., Birmingham, **$27,514** and **$19,867** respectively; Contr. 4, distr. lines, from Haines & Haines, Elkhart, Ind., **$53,000.** CD 9/16—ENR 9/24.

†Texas—U. S. Eng., 231 W. Main St., Denison, Nov. 28, water, sanitary sewers, gas sys., area drainage etc., from McLellan, Brown & McLellan, Medical Arts Bldg., Waco, **$50,000-$100,000.** CD 11/25 under Unclassified.

CONTRACTS AWARDED

†Florida—U. S. Eng., Court House, Jacksonville, water supply lines, Inv. Neg. Jax. 43-380, Orange Co., to R. E. Clarson, Inc., Power & Light Bldg., St. Petersburg, under **$50,000.** Awarded 11/25.

†Florida—U. S. Eng., Court House, Jacksonville, . ww., electric distr. sys., Inv. Neg-Jax 43-355, Sarasota Co., to R. E. Clarson, Inc., Power & Light Bldg., St. Petersburg, under **$100,000.** Awarded 11/28.

†Florida—U. S. Eng., U. S. Courthouse & Post Office, Jacksonville, water distr. sys., sewage collection sys., and pressure sewer line, Hernando Co., to C. T. Dawkins, 2424 Chicago Ave., Tampa. **$100,000-$500,000.**

★ **†Kentucky** — U. S. Eng., Federal Bldg., Louisville, storage reservoir, Hardin Co., to George Kehl & Son, 1225 N. Maplewood Ave., Chicago, Ill., under **$1,000,000.**

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, alterations, addns. water distr. sys., Inv. 43-193, to W. H. O'Toole Constr. Co., Pensacola, **Fla.** Bids 12/2, awarded 12/3.

†Oregon—U. S. Eng., Pittock Blk., Portland, water sys., Benton Co., to Ertz, Burns & Co., Lorenz Bros., D. M. Drake and Parker Schramm, Couch Bldg., Portland, under **$50,000.** Awarded 12/7.

†Texas—U. S. Eng., Fort Sam Houston, water, sewer, gas lines, Bexar Co., to Myer & Wentworth, 1760 Division Ave., San Antonio, under **$50,000.** CD 12/1—ENR 12/3.

†Texas—U. S. Eng., Fort Sam Houston, drillter, sewer, gas lines, Bexar Co., to Myer & 5 wells, Coryell Co., to Layne-Texas Co., 6931 Harrisburg Blvd., Houston, **$100,000-$500,000.** CD 12/11.

†Texas—U. S. Eng., **231** Main St., Denison, water sanitary sewer and gas lines, area grading, Smith Co., to Panhandle-Sira-Dalton, 9301 Elm St., Dallas, **$100,000-$500,000.** Bids about 12/12. CD 11/27—ENR 12/3.

†Washington—U. S. Eng., 800 3 Ave., Seattle, WW sys., extens., alterations, Pierce Co., to Valley Constr. Co., 8423 48 St. S., Seattle, **$50,000-$100,000.**

†Wisconsin—U. S. Eng., 520 Merchandise Mart, Chicago, Ill., constr., completion water distr. sys., electrical distr. sys. and roads, Dane Co., to Santucci Constr. Co., Skokie, Ill., **$50,000-$100,000.**

Alta., Lethridge—Dpt. Munitions & Supplies, Ottawa, Ont., water sys. and sewage disposal plant at No. 8 Bombing and Gunnery School, to Poole Const. Co. Ltd., 213 Tegler Bldg., Edmonton, **$23,000.**

Alta., Vulcan — Dpt. National Defence for Air, Ottawa, Ont., water and sewer services, at Flying Instructor's School, to Waterman & Waterbury Mfg. Co. Ltd., Rose and 7 Sts., Regina, Sask. **$17,000.**

Man., Rivers—Dpt. Natl. Defense for Air, Ottawa, Ont. water sys., at Central Air Navigation School to H. D. Sprateing, 1217 13 St., Brandon, **$27,000.**

Ont., Kitchener—Lang Tanning Co., Ltd., 7 S. Francis St., 150,000 gal. rein.-con. water reservoir, to Ball Bros., 49 E. King St.

SEWERS WASTE DISPOSAL

PROPOSED WORK

Conn., New Britain—H. L. Connor, chn. Comm., City Hall, incinerator. $75,000. G. Molleur, City Hall, engr.

†Md., Cheverly — Washington Suburban Sanitary Comn., Hamilton St., Hyattsville, rejected bids Nov. 18, sanitary sewers, in 62 St. along Beaver Dam Branch to Landover Rd. Contr. 162-S. CD 12/1—ENR 12/3 under LB.

†Oklahoma—U. S. Eng., 416 Wright Bldg., Tulsa, bids soon sewer, water, gas lines, grading, paving streets and roads, Oklahoma Co. Over $25,000. Plans deposit $30.

†Texas—U. S. Eng., Fort Sam Houston, exten. sanitary sewer lines, facilities, Bell Co. $25,000.

†Tex., Orange — Federal Works Agency, 1309 Electric Bldg., Fort Worth, sanitary sewers, incl. lift sta., new pump. unit, 12-18 in. pipe, etc., $75,000; sewage disposal plant, Tex. 41-573. $61,006 allot. C. F. Smith, Orange, engr.

★ **Wis., Milwaukee**—Sewers. $893,000. J. P. Schwada, city engr.

B. C., Vancouver—Alex. MacDonald, municipality com., exten. sewers, outlying district. $75,000.

Ont., Toronto—H. H. Augus, engr., 1221 Bay St., and E. A. Cross, engr., 989 Bay St., bids soon, addnl. work, sewer extens., drainage sys., etc., incl. septic tanks, central sewage collecting and settlement tanks, Sheppard Ave. west Dufferin St., for De Havilland Aircraft of Canada, Ltd., Sheppard 9Ave. $110,000.

BIDS ASKED

Bids Asked January 5

Nev., Ely—Comrs. White Pine Co., septic tank.

Bids Asked

†Connecticut—Bridgeport Housing Auth., 252 Hallett St., Bridgeport, sewerage sys. and disposal plant, for housing, Conn. 6071, for NHA. $100,000. Extended date. Plans deposit $25 and $5 each addnl. set. Whitman & Howard, 89 Broad St., Boston, Mass., engrs. CD 12/7—ENR 11/26.

†Texas—U. S. Eng., Fort Sam Houston, sewage disposal plant, Coryell Co. $80,000. Plans deposit $50.

LOW BIDDERS

†Calif., Burbank—Federal Works Agency, 1206 Santee St., Los Angeles, Dec. 1, 4th sect. Lockheed storm drain, Docket Calif. 4-458, Contr. 4, from Werner & Webb, 1116 N. Mansfield Ave., Los Angeles, **$54,417.** CD 11/24—ENR 12/3 under BA.

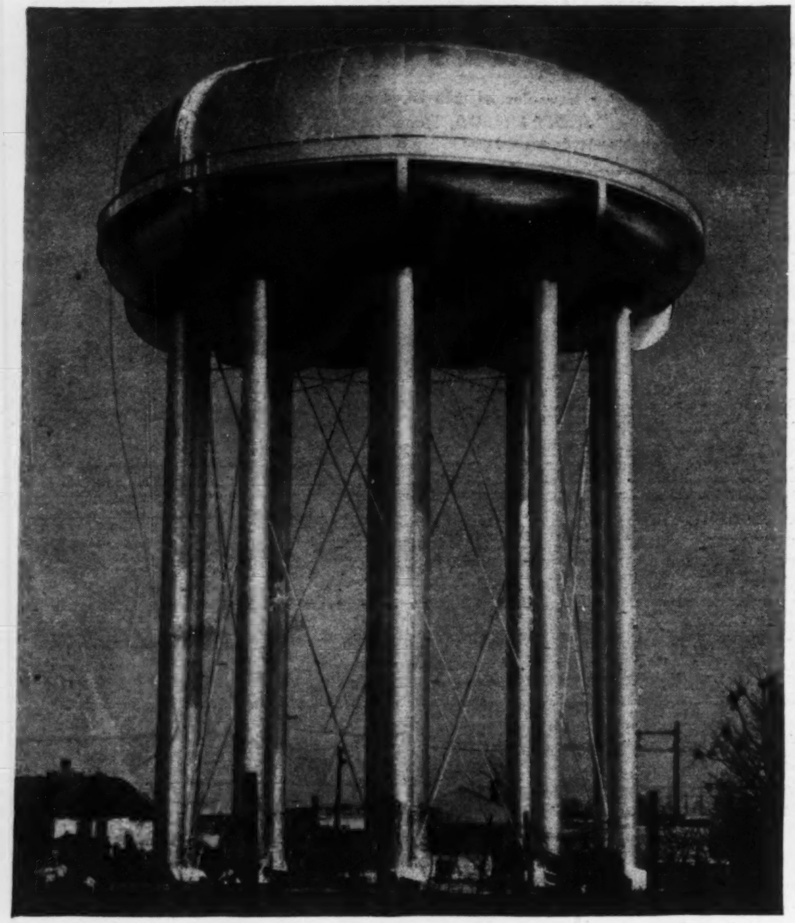
†Mo., Neosho—City, c/o G. Woods, mayor, Nov. 23, sewage disposal plant and 43,000 ft. sewerage sys., from D. Pray, Monett, **$304,000.** Est. $262,000. **FWA.** CD 11/9—ENR 11/12.

CONTRACTS AWARDED

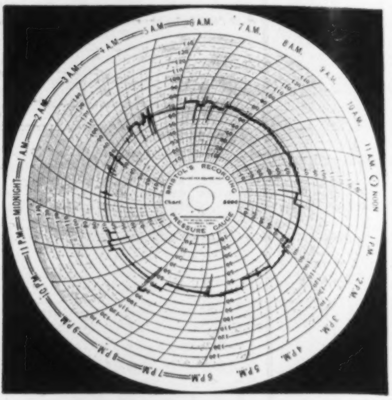
★ **†Georgia**—U. S. Eng., Post Office Bldg., Savannah, sewage treatment works exten., Liberty Co., to Espy Paving & Constr. Co., 108 E. Bay St., Savannah, **$500,000-$1,000,000.**

†Georgia—U. S. Eng., Marietta, disposal plant, Cobb Co., to Central Contg. Co., 1st Natl. Bank Bldg., Atlanta. CD 12/7.

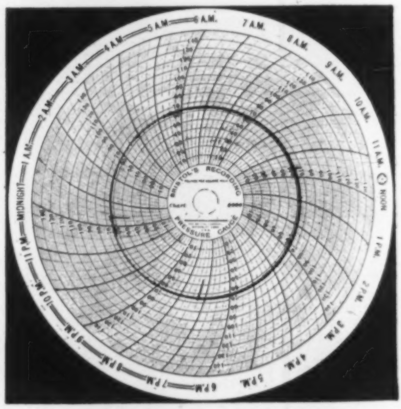
★ **†Kansas**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., storm sewer, Douglas Co., to L. G. Barcus, 1051 State St., Kansas City, Kan., and Kramme & Jenson, 402 Teachout Blvd., Des Moines, Ia. Est. **$500,000.** Broderick & Gordon, Mastin Bldg., Kansas City, Mo., management contractors. W. S. Lozier, Mastin Bldg., Kansas City, Mo., archt.



LEFT: 750,000-gal. radial-cone elevated water tank in the Dothan, Alabama, waterworks distribution system.



BEFORE: The above chart shows the pressure in the Dothan water system on February 5, 1939—before the new tank was in service.



AFTER: This chart shows the pressure in the water system on August 15, 1939—after the 750,000-gal. elevated water tank was placed in service.

MORE POWER for the day shift

Several years ago the city of Dothan, Alabama, installed a 750,000-gal. radial-cone tank in its water system to relieve the local power plant of the pumping load during the day so that more power could be used for cotton gin and oil mill operation. This is accomplished by pumping at night and letting the supply in the tank take care of water usage during the day.

In addition to releasing power generating capacity for other purposes, the present method of operating actually reduces pumping costs and improves distribution pressures. By pumping at night, the maximum 15-minute demand is held down to about 125 kilowatts, effecting a saving of approximately $1,500 per year.

The effect of elevated storage on distribution pressures in Dothan is told graphically in the two pressure charts at the right. Before the tank was in service there were frequent fluctuations of 10 lbs. per sq. in. or more. Now the variations, as shown in the lower chart, hardly show.

Countless cities with adequate elevated storage have reduced pumping costs and improved service at the same time. Many of them can, without impairing service, pump more of their water requirements at night and thus release generating capacity formerly used during the day for manufacturing purposes.

CHICAGO BRIDGE & IRON COMPANY

Chicago..............2101 McCormick Bldg.
New York..........3311-165 Broadway Bldg.
Cleveland..............2201 Guildhall Bldg.
Philadelphia....1623-"1700" Walnut St. Bldg.
Tulsa......................1617 Hunt Bldg.
Birmingham........1520 North Fiftieth Street
Washington................330 Bowen Bldg.
Houston..................5609 Clinton Drive
San Francisco..............1020 Rialto Bldg.

Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PENNA. In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

SEWERS (Contracts Awarded, Continued)

†La., Pineville—R. C. Lawrence, mayor, City Hall Bldg., Contr. 3, exten. sewer and water sys., Docket La-129, to R. & P. Constr. Co., Alexandria. **$74,874. FWA.** Bids 12/1 awarded 12/5. ENR 11/16—ENR 11/19.

†Texas—U. S. Eng., 231 W. Main St., Denison, underground sanitary sewers and natural gas lines, facilities, Gregg Co., to Panhandle-Sire-Dalton, 3101 Elm St., Dallas, **$100,000-$500,000.**

†Texas—U. S. Eng., Fort Sam Houston, storm sewers, Bexar Co., to Anderson & Waite, 726 W. Russell Pl., San Antonio, over **$50,000.** CD 11/12—ENR 1/19, under Unclassified, CA.

†Texas—U. S. Eng., Fort Sam Houston, addnl. contract outfall sanitary sewer, Bexar Co., to Calvert & Watts, 302 Barrett St., San Antonio, under **$50,000.**

Tex., Corpus Christi—Sanitary sewer line from Highland and Morgan Sts. to Mary and Meuly Sts., to school, etc. to Brown & Root, Inc., Corpus Christi, **$25,000.**

†Washington—U. S. Eng., 800 3 Ave., Seattle, sanitary sewers, Pierce Co., to Thorburn & Logozo, 4608 36 Ave. S.W., Seattle, **$100,000-$500,000.**

Ont., Hamilton—J. F. Berry, city clk., storm sewer, Strathearn Ave., to W. R. Worthington Constr. Co., Ltd., 332 Lytton Blvd., Toronto, **$217,700.** Est. $250,000. Bids 12/8. CD 12/1—ENR 12/3.

Ont., Malton—Dpt. Natl. Defense for Air, Ottawa, sewage disposal plant, water supply sys., at No. 1 Air Observers School, to Armstrong Brothers Co. Ltd., 75 Main St. N., Brampton, **$224,000.**

★ **Que., Quebec City**—Sewers in Marie de l' Incarnation and Kiranac Sts., day labor. **$560,000.** E. Hamel, City Hall, engr.

Ont., St. Catherines—Sewers for Wartime Housing Project, day labor, **$25,000.**

BRIDGES GRADE CROSSINGS

PROPOSED WORK

Iowa-Illinois — Clinton, Ia. Bridge Comn., Clinton, Ia., bridge over Mississippi River between Clinton, Ia. and Fulton, Ill.

Wis., Milwaukee—Restoration Wisconsin Ave. viaduct. $225,000. J. P. Schwada, city engr.

Ont., Forest Hill—F. G. Gardner, reeve of village, bridge, Eglinton Ave. $25,000. James, Proctor & Redfern, Excelsior Bldg., Toronto, engrs.

Quebec—Provincial Govt., Quebec City, bridge over Montreal River, Sherrington. $35,000. E. Gohier, Dpt. Roads, Quebec City, engr.

CONTRACTS AWARDED

N. J., Freehold—Freeholders Monmouth Co., Courthouse, reconstructing bridges in Wall and Manalapan, to Freibott Bros., Main St., Port Monmouth, **$25,060.** O. Seaman, Courthouse, engr. CD 12/3.

Oklahoma—State Hy. Dpt., Oklahoma City, 4 concrete bridges, Pittsburg Co., to R. S. Thompson, Insurance Bldg., Oklahoma City, **$61,581.** Est. $65,000. Awarded 12/4.

Que., Dolbeau—Province of Quebec, Quebec City, reconstructing bridge over River Mistassini, substructure to L. P. Couture, Jonquiere, **$9,000;** superstructure, to Lord & Co., Ltd., 4700 Iberville St., Montreal, **$30,000.**

Que., Huntingville (P. O. Lennoxville)—Ascot Twp., c/o W. R. Lennoxville, rein.-con. bridge, pier and abutments over River Salmon, to J. Houle, 7 Notre Dame St., St. Victor de Tring. Est. **$25,000.** O. Desjardins, Dpt. P. Wks., Quebec City, engr. CD 9/14—ENR 9/17.

STREETS AND ROADS

BIDS ASKED

Bids Asked December 22

★ **Ohio**—State Hy. Dpt., Columbus, Part 1, grading, drainage structures, waterbound macadam widening, asphaltic concrete paving, and roadside imprv., 1.653 mi. Buckeye Rd., Shawnee Twp., $41,100; Part 2, grading, drainage structures, concrete paving, roadside imprv. 0.578 mi. sect. Greenlawn Ave., in city of Lima, $38,400; Part 3, grading, drainage structures, concrete paving, roadside imprv. 0.807 mi. Sects. Lima and I of SH 126, U.S. 25, $46,000, all foregoing in Allen Co.; grade crossing elimination project with B. & O., Penna. and N. Y. C. Railroads, erecting concrete beam, continuous steel beam and continuous concrete beam superstructure and erecting concrete rigid frame structure over 5 Ave., grading, drainage structures, concrete paving, roadside imprv. 2.243 mi. Mifflin Twp. sect. of James Rd., Columbus, Franklin Co., $656,220; grading, drainage structures, concrete paving, roadside imprv. 0.118 mi. sect. of South St., Fairfield, Green Co., $38,509; grading, drainage structures, hot-mixed, hot-laid asphaltic concrete paving, concrete paving and roadside imprv., 1.094 mi. sect. of S. Arlington St., Akron, Summit Co., $219,000; grading, drainage structures, waterbound macadam widening, asphaltic concrete resurfacing 2.114 mi. Sect. A of SH 153, Trumbull Co., $128,000.

Virginia — Dpt. Hys., Richmond, concrete paving, bit. center strip 0.77 mi. Route 168, DA-NR 699-A5W, C1W, D1W, E1W, E2W, D2W, Fed. Project DA-NR 43-A(L) Warwick, James City and York Counties.

Virginia—Dpt. Hys., Richmond, sidewalk, miscellaneous items, 2.2 mi. Route 237, SP S-1423-SW, Arlington Co. Plans deposit $5.

Bids Asked

Calif., Los Angeles—Bd. P. Wks., City Hall, rejected bids Sept. 2, imprv. Olympic Blvd. Park View St. to Western Ave. Postponed for duration. CD 9/9—ENR 9/17 under LB.

LOW BIDDERS

Georgia—State Hy. Dpt., Atlanta, Dec. 11, imprv. 3.837 mi. road also 1 bridge, Macon Co., from Crummey & Crummey, Rochelle, **$81,079*****1.267 mi. Chatham Co., from Wm. F. Bowe, Jr., Augusta, **$49,879*****6.199 mi. Towns Co., from Scott Constr. Co., Thomasville, **$90,808.** CD 12/8.

CONTRACTS AWARDED

†Colorado—U. S. Eng., Albuquerque, N. M., road construction, Las Animas Co., to Warrington Constr. Co., Cheyenne, Wyo., under **$50,000.**

†Florida—U. S. Eng., Court House, Jacksonville, road, Inv. Neg.-Jax-43-357, Manatee Co., to J. L. Cone & J. D. Manly, Caesar Ave. and Cumberland St., Tampa, less than **$50,000.**

†Illinois—U. S. Eng., U. S. Court House & Custom House, St. Louis, Mo., 1,000 sq. yd. concrete sidewalks and 1,000 sq. yd. boardwalk, Madison Co., to Brockmeyer Constr. Co., 634 N. Grand Blvd., St. Louis, Mo. Est. under **$50,000.**

†Maryland—U. S. Eng., Standard Oil Bldg., Baltimore, roads, shoulders, floors, etc., Harford Co., to H. R. Miller Co., Lancaster, **$100,000-$500,000.**

†Mississippi—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, roads, Grenada Co., to Morrissey & Knost, Vicksburg, **$100,000-$500,000.**

†New Jersey — U. S. Eng., 120 Wall St., New York, N. Y., grading, repairing, imprv. roads, Essex Co., to Santaniella Bros., 16 Whyte St., Jersey City, **$50,000-$100,000.**

N. J., Westfield—G. & F. Contg. Co., 63-24 Roosevelt Ave., Woodside, grading, roads at residential development, to D. & L. Contg. Co., 1781 Winfield St., Rahway, **$25,000.**

†New Mexico — U. S. Eng., Albuquerque, grading, asphalt and concrete paving, Lea Co., to Waco Constr. Co., 1201 Medical Arts Bldg., Waco, Tex., **$100,000-$500,030.** Bids about 11/30. CD 11/24.

†North Carolina—U. S. Eng., Fort Bragg, clearing, grubbing, grading, etc., Moore Co., to Grannis, Higgins, Thompson & Street Co., Goldsboro.

★ **Ohio** — State Hy. Dpt., Columbus, imprv. 5.181 mi., Lorain and Medina Counties, to A. J. Baltes, Inc., 11 Olive St., Norwalk, **$555,847.** Est. $558,000. Bids 11/24. CD 12/8—ENR 12/10 under LB.

Oklahoma—State Hy. Dpt., Oklahoma City, imprv. 7.1 mi. road, Atoka Co., to J. Briscoe, Stillwater, **$126,501,** est. $125,000***3.5 mi. and 5.4 mi. Tillman Co., to Richards & Mullinix, 1405 W. 5 St., Oklahoma City, **$42,855** and **$42,472** respectively, est. $45,000 each***2.039 mi. Oklahoma Co., to Moran & Buckner, Muskogee, **$196,681,** est. $177,687. Grand total $408,509. Awarded 12/4.

†Tennessee — U. S. Eng., P. O. Box 97, Memphis, roads, walks, No. 1092-43-127F, Shelby Co., to Building Constructors, Inc., Dermond Bldg., Memphis, under **$50,000.**

†Texas—U. S. Eng., Fort Sam Houston, road, Bell Co., to M. E. Ruby and Wallace & Bowden, Austin, **$50,000-$100,000.**

Texas—U. S. Eng., Fort Sam Houston, constructing, repairing road, to Southern States Constr. Co., 2-3 San Jacinto Bank Bldg., Houston, under **$50,000;** grading, embankment, etc., to L. Vernon Miller, 1st Natl. Bank Bldg., Houston, under **$50,000,** both Matagorda Co.

†Washington—U. S. Eng., 810 3 Ave., Seattle, grading, surfacing, Whatcom Co., to A. W. Stevens Constr. Co., Mount Vernon, **$100,000-$500,000.**

P. E. I., Charlottetown—Dpt. Natl. Defense for Air, Ottawa, Ont., roads, walks, etc. at No. 10 Bombing and Gunnery School, near here, to Curran & Briggs, Ltd., North St., Summerside, **$70,000.**

Que., Montreal—Dpt. National Defense for Air, Ottawa, Ont., roads, walks, etc. at Air Operational Training unit, near here, to L. G. Ogilvie & Co. Ltd., 2228 Walkeley Ave., **$28,000.**

EARTHWORK WATERWAYS

PROPOSED WORK

La., Abbeville—Bayou Tigre Dist., c/o R. E. Golden, secy., Erath, drainage work. $50,000 bonds voted.

LEADITE

The Pioneer Self-Caulking Material for C. I. Pipe

THERE'S only one

100 LBS.
LEADITE
CEMENT
for JOINTING WATER MAINS
MANUFACTURED BY
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PHILADELPHIA, PA

The pioneer self-caulking material for cast iron bell and spigot water pipe which, for more than 40 years, has saved caulking time, digging time, melting time, handling time and charges . . . and made good tight joints which *improve with age!*

THE LEADITE COMPANY

Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking

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JETTING PUMPS

FOR SALE RENT

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ANNOUNCING

THE ANNUAL HIGHWAY NUMBER ENGINEERING NEWS-RECORD

JANUARY 14 ISSUE

★ The final installment of "Alcan—America's Glory Road," the inside story of the Alaska Highway, starting in this issue, will appear in the Annual Highway Number.

Engineering News-Record thus will complete this modern northland saga of the road-builder's art in an issue which will devote special attention to highway problems.

The highway issue will include a special section devoted to problems that war restrictions have brought to state highway departments. Present plans call for an article by a prominent highway authority on the over-all national picture.

This will be supplemented by analyses of road maintenance problems and how they are being solved in various sections of the country. In addition there will be a discussion of concrete pavement designs, in which use of critical materials has been eliminated. Also, statistics of highway work done in 1942 and work planned for 1943.

Thus the Highway Number will provide a wealth of useful editorial material. The advertising pages, too, will offer much helpful information on how to conserve materials . . . how to make machinery last longer . . . how to get the most out of equipment.

Make sure you receive your copy of this informative Highway Number. If you plan to change your address before Jan. 14, notify Engineering News-Record immediately.

★ ★ ★

HOW NEWS-RECORD GOT THE ALCAN STORY

H. W. Richardson, Western Editor, spent six weeks traveling over the new road's 1,671 miles. He was, incidentally, the first person ever to make the trip. And by sheer accident, he was present when Army bulldozer crews, working from East and West, came together to close the last gap. Despite finger-numbing cold, Editor Richardson took pictures of this historic event. His story, illustrated with on-the-job photographs, begins in this issue. The second article will appear on Dec. 31, the final installment in the Annual Highway Number, Jan. 14.

ENGINEERING NEWS-RECORD

A McGRAW-HILL PUBLICATION • *330 W. 42nd St., New York, N. Y.*

EARTHWORK (Proposed Work, Cont'd.)

Wis., Milwaukee—Bd. Harbor Comn., H. C. Brockel, mgr., dredging Milwaukee River. $35,000. J. P. Schwada, city engr.

Wis., Milwaukee—South Shore Bluff erosion elimination $50,000; flushing tunnel intake pier protection $20,000; reinforce municipal mooring basin revetment $50,000. J. P. Schwada, city engr.

BIDS ASKED

Bids Asked December 23

†Missouri—U. S. Eng., P. O. Box 97, Memphis, Tenn., 2,340,000-2,853,000 cu. yd. earthwork Upper St. Francis Levee Dist. (Birds Point-New Madrid Setback Levee).

Bids Asked December 29

Calif., Long Beach—Bd. Supervs. Los Angeles Co., Hall of Records, Los Angeles, part Los Cerritos Drainage sys., 350,000 cu. yd. earth excav. Over $15,000. CD 12/4.

Bids Asked December 30

†Arkansas—U. S. Eng., P. O. Box 97, Memphis, Tenn., 1,279,000 cu. yd. earthwork in White River Levee Dist., (White River Backwater Levee) at Ferguson and Deep Bayou.

†Missouri—U. S. Eng., P. O. Box 97, Memphis, intermittent L. S. enlargement of levee approx. 372,000 cu. yd. W. R.-L-30A-1, 530,000 cu. yd. W.R.L.-26A-1, approx. 530,000 cu. yd. W.R.-L-18A, all foregoing White River Levee Dist.

CONTRACTS AWARDED

†California—U. S. Eng., 74 New Montgomery St., San Francisco, soil erosion control, Monterey Co., to Granite Constr. Co., Box 900, Watsonville. Awarded 12/7.

★ **†Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, main project, installing flood gates on Colorado River, at intersection of river and Intracoastal Waterway, Matagorda Co., to Brown & Root, Inc., P. O. Box 3, Houston. Est. **$1,000,000.** CD 11/16—ENR 11/19 under LB.

UNCLASSIFIED

PROPOSED WORK

†California—SITE GRADING, etc.—Alameda Housing Auth., 1711 2 St., Alameda, negotiating contract rough grade and fill, and some sewer work in connection with construction housing, Encinal Proj. Cal. 4114 and rough grade and fill, Chipman Project Cal. 4113, for NHA. A. T. Hass, 525 Market St., San Francisco, and C. I. Warnecke, 1700 Financial Center Bldg., Oakland, archts. G. E. Atkins, Hobart Bldg., San Francisco, mechanical engr. CD 11/30—ENR 12/3.

Ind., South Bend—IMPROVEMENTS—Bd. Comrs. St. Joseph Co., N. A. Muszer, aud., Court House, completed revised plans imprvs., bldg. $132,000. E. W. Young, 807 Sherland Bldg., archt. CD 2/16—ENR 2/19.

★ **†Kansas**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs. $3,000,000.

★ **†Kansas**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., bids soon, imprvs., Ford Co. $1,000,000.

Louisiana—AERIAL CROSSING—United Gas Pipe Line Co., 1515 Fairfield Ave., Shreveport, aerial crossings for telephone lines, La Fourche Parish.

Louisiana—OIL PIPELINE—Texas Co., 919 St. Charles St., New Orleans, installing, maintaining 3 in. pipeline 3 ft. below bottom in Hackberry Bay, (Bay De Chene), Lefourche and Jefferson Parishes. Applied for War Dpt. permit.

Louisiana—OIL WELL—L. J. Roussel, Lake Charles, test oil well development, Lake Charles Parish, Lake Charles Area. Over $25,000.

Louisiana—GAS WELLS—Sweet Lake Land & Oil Co., Lake Charles, drilling, developing deep test gas wells, Big Lake Area, Cameron Parish. Over $25,000.

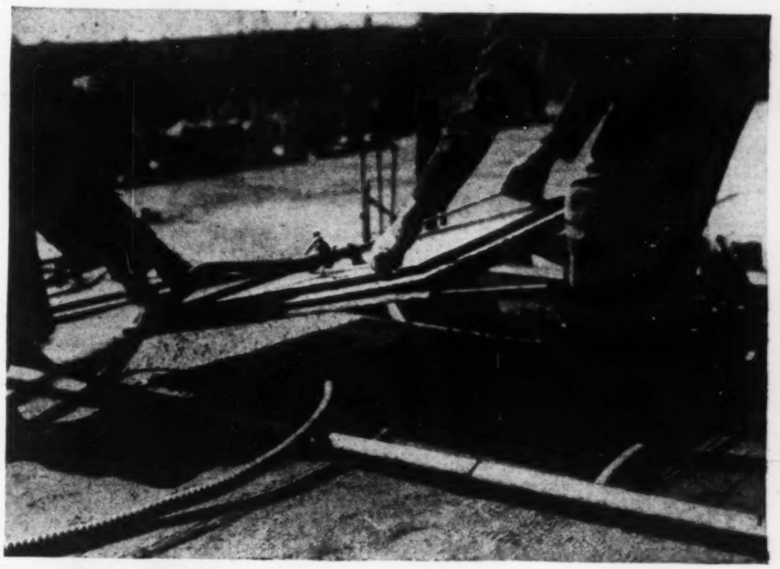
La., Carterville—OIL WELL—Hunt Oil Co., City Bank Bldg., Shreveport, deep test oil well development. Over $25,000.

La., Greenwood — AERIAL CROSSING — United Gas Line Co., 1515 Fairfield Ave., Shreveport, aerial crossing for telephone lines across Bayou Black, near here.

La., Lake Charles—GAS WELL—Atlantic Refining Co., Lake Charles, developing deep test gas well, near here. Over $25,000.

La., Lake Charles—GAS WELLS—Gulf Refining Co., Lake Charles, drilling, casing, developing several deep test gas wells, near here. Over $25,000.

★ **†Mass., Beverly**—IMPROVEMENTS—City, D. E. McLean, mayor, City Hall, preliminary survey, imprvs. $500,000. CAA allot. CD 10/16—ENR 10/22.



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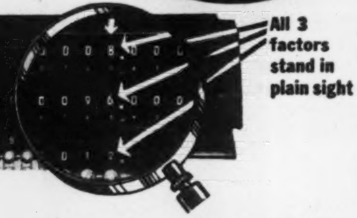
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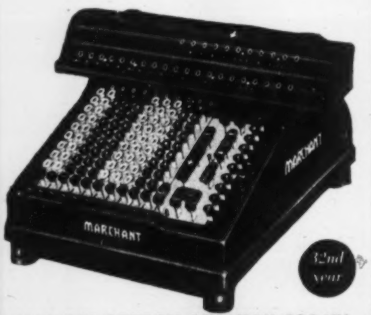

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UNCLASSIFIED, etc. (Proposed Work, Cont'd.)

Minnesota—RURAL ELECTRIC DISTRIBUTION SYSTEM—Rural Electrification Cooperative, E. C. Osterman, secy., Wheaton 430 mi. rural electric distr. sys., Big Stone, Grant, Traverse and Wilkins Counties. $179,000 tentative allot.

★**†Missouri**—IMPROVEMENTS—Civil Aeronautics Admin., City Hall, Kansas City, Mo., imprvs., Boone Co. Under $1,000,000.

★**†Missouri**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs. $3,000,000.

★**†New Jersey** — IMPROVEMENTS — U. S. Eng., 6 and Walnut Sts., Phila., Pa., imprvs., addnl. work, Burlington Co. $1,000,000.

O., Columbus—IMPROVEMENTS—Ohio Institute of Aeronautics, 330-340 E. Broad St., imprvs. $300,000. Benham & Richards, 167 E. State St., archts.

Oregon — IMPROVEMENTS — Klepp Boatyard, Rainier, imprvs. $30,000.

Tenn., Columbia—IMPROVEMENTS—City, c/o Mayor, imprvs. Site purchased.

Tenn., Murfreesboro — IMPROVEMENTS — City, c/o S. Cox, city mgr., imprvs.

★**Tenn., Nashville** — IMPROVEMENTS — Thos. L. Cummins, mayor, imprvs. Under $1,000,000.

Tenn., Pulaski — IMPROVEMENTS — City, imprvs., grading, draining. Seeking funds.

★**†Texas, Pennsylvania** and **New York** — PIPELINE CARRIER—Reconstruction Finance Corp., 811 Vermont Ave. N.W., Wash., D. C., preliminary plans 760 mi. 20 in. welded joint steel pipeline carrier between Houston, Tex., Phila., Pa., and New York, N. Y., areas, 200,000 to 250,000 bbl. daily capacity. $90,000,000.

†Texas—GAS DISTRIBUTION LINES—U. S. Eng., Fort Sam Houston, natural gas distr. lines exten., Bell Co. $25,000.

†Texas — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Bastrop Co. $50,000.

†Texas—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, rejected bids, imprvs., grading, relocating road, concrete and asphalt paving, etc., Galveston Co. Will readvertise. CD 11/30—ENR 12/3 under LB.

★**†Texas** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., bids soon imprvs., grading, site development, bldgs. Total est. $9,000,000. CD 11/17.

Tex., Alice—OIL WELL—J. Mayo and Kirkwood & Morgan, Alice, plans drilling, casing developing deep test oil well, Jim Wells Co.

Tex., Alice—OIL WELL—Smith & Mosser, Corpus Christi, drilling, casing, developing 5,400 ft. deep test well, Tract 83, Zander subdivision. Over $25,000.

Tex., Center — OIL WELL — P. H. Pweitt, Marshall, drilling, casing, developing 7,500 ft. deep test oil well, 4 mi. northeast of here, No. 1 Pickering Lbr. Co. Over $25,000.

Tex., Douglassville — OIL WELL DEVELOPMENT—Hollandsworth Drilling Co., Longview, deep test oil well development. Over $25,000.

Tex., Elmendorf—OIL WELL—Butcher-Arthur Co., c/o General Delivery, Elmendorf, drilling, casing, developing 2,500 ft. oil well, 101 acre lease Juan Mendez Grant. Over $25,000.

Tex., Freer—OIL WELL—Circle Oil Co., Commerce Bldg., Houston, 4,000 ft. deep test oil well, Duval Co.

Tex., Fort Stockton—OIL WELL—Gulf Oil Co., San Angelo, drilling, casing, developing 8,500 ft. deep test oil well, 10 mi. northwest of here. Over $25,000.

Tex., Laredo (near Bruni)—OIL WELL—O. W. Killam, Laredo, 4,000 ft. deep test oil well, Survey 455. $40,000.

Tex., Louise—OIL WELL—Pan-American Production Co., Mellie Esperson Bldg., Houston, drilling, casing, developing deep test oil well, S. P. Middleton Survey, near here. Over $25,000.

Tex., Muenster — OIL WELL — Sinclair-Prairie Oil Co., Fair Bldg., Fort Worth, 5,100 ft. deep test oil well development, Sec. 70, Fannin Survey. Over $25,000.

Tex., Newcastle—OIL WELL—Standard of Texas and Hanlon-Buchanan, Wichita Falls, drilling, casing, developing 5,000 ft. deep test oil well, part of Sec. 2370-TE&L. Over $25,000.

Tex., Noonday—OIL WELL—Iowa-Payne Oil Co., Tyler, drilling, casing, developing deep test oil well. Over $25,000.

Tex., Odem—OIL WELL—Jay Simmons, Sinton, and Republic Natural Gas Co., 1505 Federal Bldg., Dallas, drilling, developing 7,500 ft. deep test oil well, Sec. 28 Paul's sub-division. Over $25,000.

Tex., Pecos—OIL WELL—M. Unger & Associates Pecos, drilling, casing, developing oil well, Sec. 34, Blk. 16. About $25,000.

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UNCLASSIFIED (Proposed Work, Cont'd.)

Tex., Pecos—OIL WELL—Hightower Oil Co., Pecos, developing deep test oil well, Sect. 27. Over $25,000.

Tex., Plains—OIL WELL—Barnsdall Oil Co., Corpus Christi, 7,500 ft. deep test exploration oil well, Sec. 315-D Sibson, near here. Over $25,000.

†Tex., Port Arthur—OIL WELL—Humble Oil & Refining Co., Port Arthur, 10,500 ft. new deep test oil well, drilling, casing, developing, etc., I. D. Polk Survey, abstract 801, Sect. 2. Over $25,000.

Tex., Throckmorton—OIL WELL—Lion Refining Co., Throckmorton, 5,000 ft. deep test oil well. Over $25,000.

Tex., Tremont — GAS WELLS — Republic Natural Gas Co., 1505 Federal St., Dallas, drilling natural gas wells. Over $25,000.

Tex., Waskom—OIL WELL—F. A. Fuller & R. Lacy, Commercial Natl. Bank Bldg., Shreveport, La., drilling, developing 2 deep test wells, Harrison Co.

†Utah, Provo — RECREATION AREA — Natl. Park Service, C St. between 18 and 19 Sts. N.W., Wash., D. C., recreation area, swimming pool, bathhouses, social hall, picnic grounds, etc., Provo Canyon, near Deer Creek Reservoir. $90,000.

Wis., Milwaukee—ELECTRICAL INSTALLATIONS, etc.—Permanent electric installation street construction projects $75,000; traffic control installation $60,000; street and playground lighting $40,000. J. P. Schwada, city engr.

Alta., Edmonton—IMPROVEMENTS—Municipality, plans by J. Martland, 501 Civic Blk., imprvs. $40,000. CD 12/3.

Ont., Collingwood — SHIPYARD — Collingwood Shipyards, Ltd., Collingwood, altering shipyard. $117,397.

BIDS ASKED

Bids Asked December 22

N. Y., New York—TEST BORINGS—President Manhattan Boro, Municipal Bldg., Contr. 26, test borings in connection with elevated public hy. along East River Dr. and Marginal St. from point about 450 ft. east of Avenue C to E. 25 St.

Bids Asked

†Massachusetts—ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Park Square Bldg., Boston (selected list bidders), electrical distr. sys., electric supply facilities, conduit work, wiring, etc., Middlesex Co.

†Rhode Island—HEATING SYSTEM—U. S. Eng., 819 Industrial Trust Bldg., Providence (selected list bidders), heating sys., Inv. 699-43-133, Providence Co. Under $50,000.

★ **†Texas** — IMPROVEMENTS — U. S. Eng., 231 W. Main St., Denison, imprvs., bldgs., Smith Co. Over $3,000,000. Plans deposit $100.

†Texas — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Fort Sam Houston, outside electrical distr. sys., Coryell Co. Over $25,000. Plans deposit $50.

Texas—IMPROVEMENTS—Todd Dry Dock & Shipbuilding Co., Pelican Spit, Galveston, imprvs. F. R. Harris, Galveston, engr..

Tex., Iraan—OIL WELLS—Moore Bros., Midland, drilling, casing, developing 7,500 ft. deep test oil well, near Sec. 16-YZ-EL & RR; drilling, casing, developing 2,500 ft. oil well, Sect. 12, Blk Q, Jno. Small, survey; drilling, casing, developing 2,500 ft. deep test oil well, near Sec. 21-YZ-EL & RR, near here. Over $75,000.

LOW BIDDERS

†Arizona — IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., Dec. 1, imprvs., Mohave Co., from D. E. Webb, 302 S. 23 Ave., Phoenix, over **$100,000.**

Calif., San Francisco—CRIB WALL etc.—Dpt. P. Wks., City Hall, Dec. 9, wood crib wall incidental drainage structures, Bernal Ave., south of Richland Ave. Bridge, from De Luca & Son, Inc., 1745 Filbert St., **$37,950.** Est. $40,000. CD 11/23—ENR 11/26.

†Connecticut—UTILITIES, etc.—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., Dec. 7, utilities, etc., water, electrical work and sewers, Conn. 6121, from Bedford Hills Constr. Corp., New Britain, **$126,500.** CD 10/27—ENR 10/29.

†Louisiana—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., Dec. 3, imprvs., Plaquemines Parish, from T. L. James & Co., Inc., Ruston. CD 12/1.

†Oregon—STORAGE and FUELING SYSTEMS—U. S. Eng., Pittock Blk., Portland, storage and fueling sys., Jefferson and Deschutes Counties, from A. A. Pollia, 695 22 Ave., San Francisco, Calif., **$45,000.**

†South Carolina—FENCING—U. S. Eng.. 33 cellaneous bldgs., Lexington Co., from W. C. ence Co., from E. T. Gulledge, Wedgefield.

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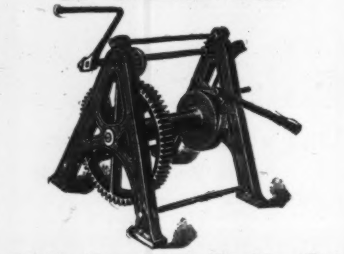

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UNCLASSIFIED (Low Bidders, Cont'd.)

†South Carolina—PAINTING—U. S. Eng., 33 Customhouse, Charleston, Dec. 4, painting miscellaneous bldgs., Lexington Co., from W. C. Winn, Columbia.

†Texas — GASOLINE STORAGE SYSTEM, etc.—U. S. Eng., Fort Sam Houston, Tex. gasoline storage and dispensing sys., [illegible] 42-390, Bell Co., from Osage Constr. Co., 907 Gulf State Bldg., Dallas. CD 11/30—ENR 12/3.

†Texas—ELECTRIC FIRE ALARM SYSTEM, etc.—U. S. Eng., 231 W. Main St., Denison, electric fire alarm and automatic sprinkler sys., facilities, Hunt Co., from City Electric Co., 2929 N. Fitzhugh St., Dallas and Grinnell Co., Inc., 1315 Marilla St., Dallas, **$50,000-$100,000.** CD 11/30—ENR 12/3.

†Texas—FIRE ALARM SYSTEM, etc.—U. S. Eng., 231 W. Main St., Denison, electric fire alarm and automatic sprinkler sys., facilities, Gray Co., from American District Telegraph Co., Interurban Bldg., Dallas and Wm. H. La Dew, 3010½ Hickory St., Dallas, **$50,000-$100,000.** CD 11/30—ENR 12/3.

CONTRACTS AWARDED

†Arizona — IMPROVEMENTS — U. S. Eng., Albuquerque, N. M., imprvs., addnl. bldgs., Cochise Co., to E. W. Duhame, 2719 N. Central Ave., Phoenix, **$100,000-$500,000.** CD 9/15—ENR 9/17.

†California—IMPROVEMENTS—U. S. Eng., 1209 8 St., Sacramento, imprvs., bldgs., Spec. 305, Butte Co., to Lawrence Constr. Co., 3511 E. Curtis Park Dr., Sacramento. Est. over **$50,000.** CD 12/3—ENR 12/10.

California — IMPROVEMENTS — Industrial Company, cafeteria bldg., San Francisco Co., to Carrico & Gautier, 365 Ocean Ave., San Francisco. K. Theill, 580 Market St., San Francisco, engr. Former contract rescinded. CD 12/10 under CA—ENR 12/3.

†Connecticut—IMPROVEMENTS—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., No. 699-43-124, Fairfield Co., to Pascone Brothers, Inc., 73 Steuben St., Bridgeport. Est. under **$50,000.** CD 12/8—ENR 12/10.

†Connecticut—IMPROVEMENTS—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., No. 699-43-121, Fairfield Co., to Leverty & Hurley Co., 260 Bostwick Ave., Bridgeport. Est. **$100,000-$300,000.** CD 12/8—ENR 12/10.

†Connecticut—IMPROVEMENTS—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., Hartford Co., to Lane Constr. Co., 37 Colony St., Meriden. Est. **$50,000-$150,000.**

★ **†Del., Dover** — IMPROVEMENTS — U. S. Eng., 6 and Walnut Sts., Phila., Pa., imprvs., paving, etc., to George & Lynch, Delaware Trust Bldg., Wilmington, to exceed **$1,000,000.**

†Florida—RIFLE RANGE—U. S. Eng., Court House, Jacksonville, rifle range, Inv. Neg. D. F. 43-11, Hillsborough Co., to Cone Bros. Constr. Co., Caesar Ave. and Cumberland Rd., Tampa, under **$100,000.** Awarded 11/23.

†Florida — SPRINKLER SYSTEM — U. S. Eng., Court House, Jacksonville, exten. sprinkler sys., Inv. Neg-Jax-43-358 Highlands Co., to Moore Pipe & Sprinkler Co., 1130 W. State St., Jacksonville, under **$50,000.** Awarded 11/20.

†Florida—SPRIGGING, etc.—U. S. Eng., Court House, Jacksonville, Fla. sprigging seeding, Inv. Neg-J.M.A. 43-6, Duval Co., to Florida Nursery & Landscape Co., Leesburg, under **$50,000.** Awarded 11/24.

†Florida—SPRIGGING, etc.—U. S. Eng., Court House, Jacksonville, sprigging and seeding, Inv. Neg-Jax. 43-374, Lake Co., to Florida Nursery & Landscape Co., Leesburg, under **$50,000.** Awarded 11/19.

†Florida—GASOLINE STORAGE and FUELING SYSTEM—U. S. Eng., Court House, Jacksonville, gasoline storage and fueling sys., Neg. Jax-43-392, Charlotte Co., to R. E. Clarson, Inc., Power & Light Bldg., St. Petersburg, less than **$50,000.**

†Florida — IMPROVEMENTS — U. S. Eng., Court House, Jacksonville, imprvs., resurfacing, Inv. Neg. Jax-43-349, Manatee Co., to J. L. Cone & J. D. Manly, Caesar Ave. and Cumberland St., Tampa, less than **$500,000.**

†Florida — IMPROVEMENTS — U. S. Eng., Court House, Jacksonville, imprvs., clearing, grubbing, grading, draining, etc., Neg. 436-43-2, Marion Co., to Hall & Caddell, 2014 Dennis St., Jacksonville, less than **$500,000.**

★ **†Fla., Fort Pierce**—IMPROVEMENTS—U. S. Eng., Court House, Jacksonville, imprvs., clearing, grubbing, grading, drainage, etc., to Middle West Roads Co., 445 Illinois Bldg., Indianapolis, Ind. To exceed **$1,000,000.**

†Georgia—CONTROL TOWER—U. S. Eng., Marietta, control tower, Cobb Co., to Van Winkle & Co., E. Pace's Ferry Rd., Atlanta.

†Idaho — IMPROVEMENTS — U. S. Eng., Pittock Blk., Portland, Ore., imprvs., grading site, Elmore Co., to J. A. Terteling & Son, Robert Noble Bldg., Boise. CD 12/4—ENR 12/10.

UNCLASSIFIED (Contracts Awarded, Cont'd.)

†Kansas — IMPROVEMENTS — U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs., roads, streets, grading, base course, Finney Co., to H. A. Gossard Constr. Co., Wichita. CD 8/2—ENR 8/27, under CA.

†Louisiana — ELECTRICAL BLACKOUT CONTROL SYSTEM, etc.—U. S. Eng., foot of Prytania St., New Orleans, installing electrical blackout control and air raid alarm sys., Inv. 43-190, to Odom & Phillips, 117 Decatur St., New Orleans. Awarded 12/7. CD 12/4.

†Louisiana—IMPROVEMENTS—U. S. Eng., foot of Prytania St., New Orleans, imprvs., bldgs., roads, Inv. 43-183, to C. W. Montague & National Constr. Co., 4616 St. Roch Ave., New Orleans. Awarded 12/5.

★ **†Louisiana**—AIR RAID ALARM SYSTEM, etc.—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., air raid alarm and blackout control sys., to E. W. Cook Co., 515 E. Capitol St., Jackson, Miss., under **$1,000,000.**

Md., Baltimore—GRADING, etc.—Pennsylvania R.R., L. P. Struble, ch. engr. (eastern region), Broad St. Sta., Phila., Pa., grading, track work, concrete fdns., underpass, etc., at North Point Rd. and Pa. R.R., to James McGraw Co., North Point Rd. and Pa. R.R.

†Mississippi—IMPROVEMENTS—U. S Eng., U. S Courthouse & Customhouse, Mobile, Ala., imprvs., bldgs., Lowndes Co., to Ralph A. Smallman & Co., Inc., 1109 5 Ave. S., Birmingham, Ala.

†Missouri—FIRE ALARM SYSTEM, etc.—U. S. Eng., 800 U. S. Courthouse & Customhouse, St. Louis, fire alarm sys., consisting coded automatic and manual fire alarm station for bldgs., automatic sprinkler alarm valves, and automatic sprinkler dry pipe valves, to be connected to alarm sys., St. Louis Co., to S. C. Sachs Co., 2022 N. 9 St., St. Louis. Bids 11/30.

†Missouri — DISPENSING SYSTEM — U. S. Eng., U. S. Courthouse & Customhouse, St. Louis, dispensing sys., St. Louis Co., to Neumayer Equipment Co., 723 S. Sarah St., St. Louis, under **$50,000.**

†Missouri — FENCING — U. S. Eng., U. S. Court House & Custom House, St. Louis, 1,600 lin. ft. fencing, Neg. 1103-43-109, St. Louis Co., to Cyclone Fence Div., American Steel & Wire Co., 1221 Locust St., St. Louis. Est. under **$50,000.**

†Missouri—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs., bldgs., Buchanan Co., to Lehr Constr. Co., 2115 Frederick St., St. Joseph. Est. **$100,000.** CD 12/7—ENR 12/10.

†New Jersey—LOADING PLATFORM, etc.—U. S. Eng., 120 Wall St., New York, N. Y., loading platform, skids, Hudson Co., to A. A. La Fountain, Inc., 161 Beech St., Hackensack, under **$50,000.**

†New Mexico—FUELING SYSTEM—U. S. Eng., Albuquerque, fueling sys., Curry Co., to R. H. Fulton & Co., Lubbock, Tex., under **$50,000.** Awarded 12/4.

†New Mexico—FUELING SYSTEM—U. S. Eng., Albuquerque, fueling sys., De Baca Co., to De Luca & Son, Inc., 1745 Filbert St., San Francisco, Calif., under **$50,000.** Awarded 12/4. CD 11/9 under **BA.**

†New Mexico — IMPROVEMENTS — U. S. Eng., Albuquerque, imprvs., Otero Co., to K. L. House Constr. Co., Albuquerque, **$50,000-$100,000.**

†New Mexico — IMPROVEMENTS — U. S. Eng., Albuquerque, imprvs., bldgs., Otero Co., to Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha, Neb., **$100,000-$500,000.**

★ **†Ohio** — IMPROVEMENTS — U. S. Eng., Wright Field, Dayton, imprvs., bldg., Montgomery Co., to J. H. Marchbank Co., 205 W. Wacker Dr., Chicago, Ill., **$750,000-$1,000,000.**

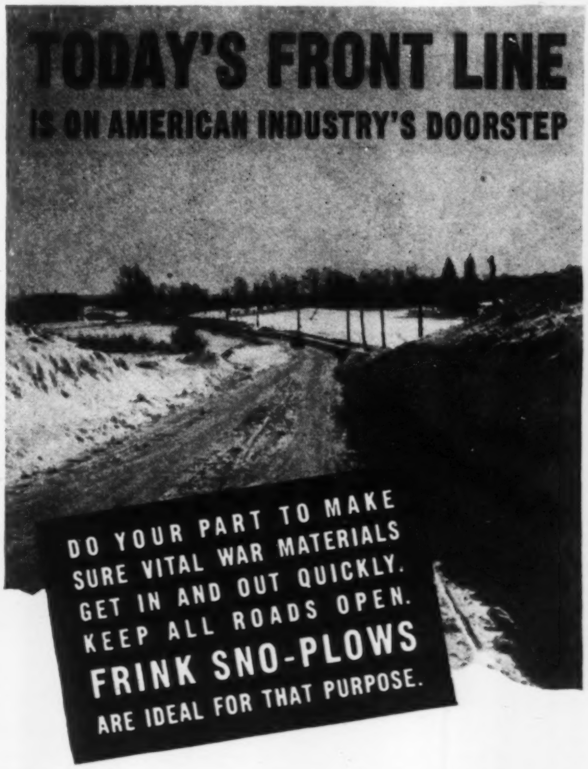
†Oklahoma — ELECTRICAL FACILITIES — U. S. Eng., 231 W. Main St., Denison, Tex., electrical facilities, fire alarm and automatic sprinkler sys., Tillman Co., to Gable Electric Service and Holtzer Cabot Co., 6713 Snider Plaza, Dallas, Tex., under **$50,000.**

†Oklahoma — ELECTRICAL FACILITIES, FIRE ALARM SYSTEM, etc.—U. S. Eng., 231 W. Main St., Denison, Tex., electrical facilities, fire alarm and automatic sprinkler sys., Jackson Co., to Gable Electric Service and Holtzer Cabot Co., 6713 Snider Plaza, Dallas, Tex., under **$50,000.** CD 11/24—ENR 12/3.

†Oklahoma—IMPROVEMENTS—U. S. Eng., Wright Bldg., Tulsa, imprvs., paving, Alfalfa Co., to Standard Paving Co., 2119 E. 11 St., Tulsa, **$100,000-$500,000.**

†Oregon—RAILROAD, etc.—U. S. Eng., Pittock Blk., Portland, railroad and access roads, Jefferson Co., to Natt McDougall Co., Sherlock Bldg., Portland, **$100,000-$500,000.** Awarded 11/7.

†Pennsylvania — IMPROVEMENTS — U. S. Eng., 6 and Walnut Sts., Phila., imprvs., Berks Co., to Hughes-Foulkrod Co., Inc., Schaff Bldg., Phila., **$100,000-$500,000.**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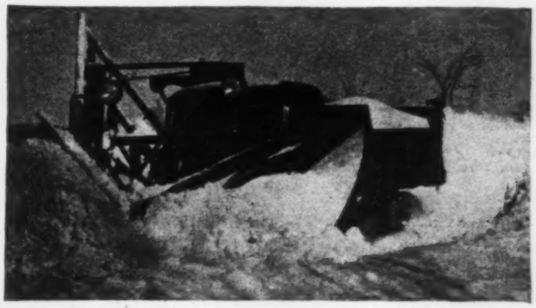

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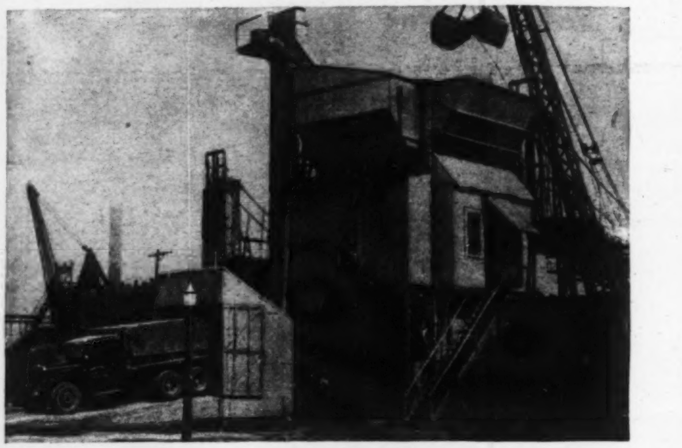

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UNCLASSIFIED, etc. (Contracts Awarded, Cont'd.)

★**Pennsylvania** — TUNNEL — Pennsylvania R.R., W. D. Wiggins, ch. eng., Broad St. Sta., Phila., tunnel imprv., tunnel 4, about 2 mi. west of Burgettstown on Panhandle, 1,000,000 cu. yd. grading, to Ferguson & Edmondson Co., Keystone Bldg., Pittsburgh. Est. **$500,000.** CD 12/7—ENR 12/10.

†**Rhode Island** — IMPROVEMENTS — U. S. Eng., 819 Industrial Trust Bldg., Providence, imprvs., No. 699-43-123, Kent Co., to A. E. Bragger Constr. Co., 333 Potter Ave., Warwick. Est. under **$50,000.** CD [illegible]—ENR 12/10.

†**Texas**—ELECTRICAL WORK—U. S. Eng., 231 W. Main St., Denison, electrical work for imprvs., bldgs., Smith Co., Solic. 257-43-123, to Rogers Electric Co., Henderson, **$6,200.** CD 12/9, under CA.

†**Texas** — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Hays Co., to Texas Bitulithic Co. and Gulf Bitulithic Co., 111 Commerce St., Dallas, under **$50,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., bldgs., Taylor Co., to Ross Constr. Co., Abilene, under **$50,000.**

†**Texas** — ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Fort Sam Houston, addnl. supplemental contract, outside electric distr. sys., Bexar Co., to Wright Bros. Electric Co., 405 Main St., San Antonio, under **$50,000.**

†**Texas** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., 25 St. and Avenue F, Galveston, outside electrical distr. sys., Midland Co., to McLellan, Brown & McLellan, Medical Arts Bldg., Waco, under **$50,000.** Bids 11/28. CD 11/25.

†**Texas**—FIRE ALARM SYSTEM, etc.—U. S. Eng., 231 W. Main St., Denison, fire alarm sys., electrical sys., Childress Co., to Gable Electric Service, 6713 Snider Plaza, Dallas, under **$50,000.** CD 11/24—ENR 12/3.

†**Texas**—FIRE ALARM SYSTEM, etc.—U. S. Eng., Fort Sam Houston, automatic fire alarm sys., electrical facilities, Brown Co., Spec. 42-517, to American District Telegraph Co., 155 6 Ave., New York, N. Y.

†**Texas**—IMPROVEMENTS—U. S. Eng., Albuquerque, N. M., imprvs. and shed, Lubbock Co., to McMillan & Glover, Lubbock, **$50,000-$100,000.** CD 11/18.

†**Texas**—IMPROVEMENTS—U. S. Eng., 231 W. Main St., Denison, imprvs., Dallas Co., to Cedric Burgher Constr. Co., 3027 Main St., Dallas, **$50,000-$100,000.**

†**Texas**—IMPROVEMENTS—U. S. Eng., 231 W. Main St., Denison, imprvs., bldgs., Solic. 257-43-123, Smith Co., to Campbell & Kay, Tyler, **$100,000-$500,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Spec. 42-389, Bell Co., to Austin Road Co., 1813 Clarence St., Dallas, over **$50,000.** CD 11/30—ENR 12/3.

†**Texas** — IMPROVEMENTS — U. S Eng., Fort Sam Houston, imprvs., bldgs., Bexar Co., to L. Christy, 503 Builders Exchange Bldg., San Antonio, **$50,000-$100,000*****electrical work for bldgs., Bexar Co., to Allen Electric Co., Main Ave., San Antonio, **$2,585** ***service drive, Bexar Co., to R. E. Lanham, 124 Argo St., San Antonio, under **$50,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., Federal Bldg., Galveston, imprvs., to B & H Constr. Co., Construction Bldg., Dallas. **$50,000-$100,000.**

†**Texas**—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, imprvs., Webb Co., to Noser Constr. Co., McAllen, **$50,000-$100,000.** CD 11/11—ENR 11/19.

†**Texas**—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, imprvs., bldgs., utilities, Tom Green Co., to Ross Constr. Co., Brownwood, **$100,000-$500,000.**

†**Texas**—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, imprvs., Midland Co., to Gaylord Constr. Co., 806 Blodgett St., Houston, **$100,000-$500,000.** Bids 12/3. CD 11/30.

Tex., Karnes City—OIL WELLS—Dan Auld, H. Coquats & Associates, Corpus Christi, drilling, casing, developing 4 deep test, 7,000 ft. each oil wells, to H. Coquat, Corpus Christi. Est. **$160,000.** CD 12/1—ENR 12/3.

Tex., La Gloria—OIL WELL—Shell Oil Co., Corpus Christi, drilling, developing 8,100 ft. deep, test oil well, 4½ in. casing, to S. E. Wilson, Corpus Christi, **$42,500.** Est. $65,000. CD 11/17—ENR 11/19.

Tex., Midway—OIL WELL—Phillips Petroleum Co., Sinton, drilling, casing, developing 10,000 ft. deep test oil well, near here, to Allen & Morris, Sinton, **$68,000.** CD 11/19—ENR 11/26.

Tex., Odessa — OIL WELL — R. Lee, San Angelo, drilling, developing 5,000 ft. deep test oil well, Ector Co., to Halmerich & Payne, Inc., Mayo Bldg., Tulsa, Okla., over **$25,000.** CD 11/25—ENR 12/3.

UNCLASSIFIED (Contracts Awarded, Cont'd.)

†Washington—PIPING, etc.—U. S. Eng., 810 3 Ave., Seattle, piping, to Bumstead-Woolford Co., 1411 4 Ave. Bldg., Seattle, **$100,000-$500,000*****pump. equipment for water supply line, to General Machinery Co., E500 Rivers Ave., Spokane, under **$50,000*****storage and warehouse, to Hansen & Weidner, 1517 Jackson St., Spokane, under **$50,000**, all foregoing Spokane Co.

†Washington—GRADING, etc.—U. S. Eng., 800 3 Ave., Seattle, grading, surfacing, Thurston Co., to C. H. Wheeler, 612 Pittock Blk., Portland, Ore., **$100,000-$500,000.**

★**Que., Quebec City** — DAM — Donnacona Paper Co., Ltd., 44 St. Louis St., dam, to Komo Constr. Co., Ltd., 814 St. Vallier St. Est. **$500,000.**

Que., Quebec City—RADIO RANGE STATION—Dominion govt., Ottawa, Ont., radio range station, to C. Jobin Ltd., 182 Latourelle St., **$25,000.** Dpt. Transport, Ottawa, Ont., engrs.

Sask., Assiniboia—IMPROVEMENTS—Dpt. National Defense for Air, Ottawa, Ont., imprvs., to Waterman-Waterbury Mfg. Co. Ltd., Rose St. and 7 Ave., Regina, **$52,000.** CD 11/5.

Sask., Mossbank—SWIMMING POOL, etc.—Dpt. Natl. Defense for Air, Ottawa, Ont., swimming pool, altering barracks at No. 2 Bombing and Gunnery School, to Bird Constr. Co., Ltd., 7 and Smith Sts., Regina, **$33,000.**

LATIN AMERICA

Colombia—Adean National Corp., **Cartagena,** will construct 3 story resort Hotel Caribe, on Boca Grande peninsula, by own forces. Major part of financing was advanced by Government***Colombian Govt., Bogota, plans extending motor highway from **Medellin** via Valdaria, Sahagun and Carmen to **Cartagena** soon.

Colombia—Government of Colombia, Bogota, constructing 80 kilometer road from Cartagena to Sabana Larga, to Winston Bros. Co., 1470 Northwestern Bank Bldg., Minneapolis, Minn., U. S. A.

Honduras — Emergency Rehabilitation Div., Office Inter-American Affairs, 14 St. between E St. and Constitution Ave. N.W., Wash., D. C., will build road from Potrerillos to Lake Yojoa, by day labor. A. K. Haxstun, c/o owner, engr.

Mexico—Dpt. Pub. Works & Communications, c/o E. F. Suarez, secy. Finance, Mexico City, plans 11 army airfields, training stations, between Matamoros in State of Tamaulipas and Progreso in state of Yucatan. Est. over $1,000,000.

Mexico—Mexican Natl. Railway Lines, c/o Federal Govt., Mexico City, plans reconstructing large locomotive and mechanical repair shop, Escobedo, Empalme, $500,000.

Panama—Government of Panama, Panama City, plans highway from Boquete to Bocas del Toro. Colonel Manuel Pino, minister Public Affairs.

Venezuela — Venezuelan Ministry P. Wks., **Caracas,** plans aqueduct to bring in water from mountain streams, also sewage disposal sys.***Luis Roche, **Caracas,** will construct large shopping center on eastern outskirts of city, incl. theatre, post office, bank, telegraph, radio station and restaurant, by own forces.

PUBLIC BUILDINGS

PROPOSED WORK

★**†Ariz., Flagstaff**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 200 unit housing, Ariz-2221.

★**†Ariz., Miami**—Pub. Housing Auth., NHA, 784 Market St., San Francisco, Calif., 286 unit temporary dormitory housing, Ariz-2121.

†Ariz., Wickenburg—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 50 unit housing, Ariz-2202.

★**†Ariz., Warren** — Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 236 unit family housing, Ariz-2120; 286 unit temporary dormitory housing, Ariz. 2121.

★**†Ark., Bauxite**—Pub. Housing Auth., NHA, 1309 Electric Bldg., Fort Worth, Tex., plans by Erhart & Eichenbaum, Gem Bldg., Little Rock, 550 unit dormitory apartments, Ark-3048. CD 10/19—ENR 10/22.

†California—Henry J. Kaiser Co., Latham Square Bldg., Oakland, shop. Federally financed.

★**†California**—Housing Auth. City of Vallejo, Victory Apartments, Ryder St., Vallejo, plans by D. H. Horn, 564 Market St., San Francisco, housing Cal-4511, and dormitory housing Cal-4219. CD 12/8—ENR 12/10.

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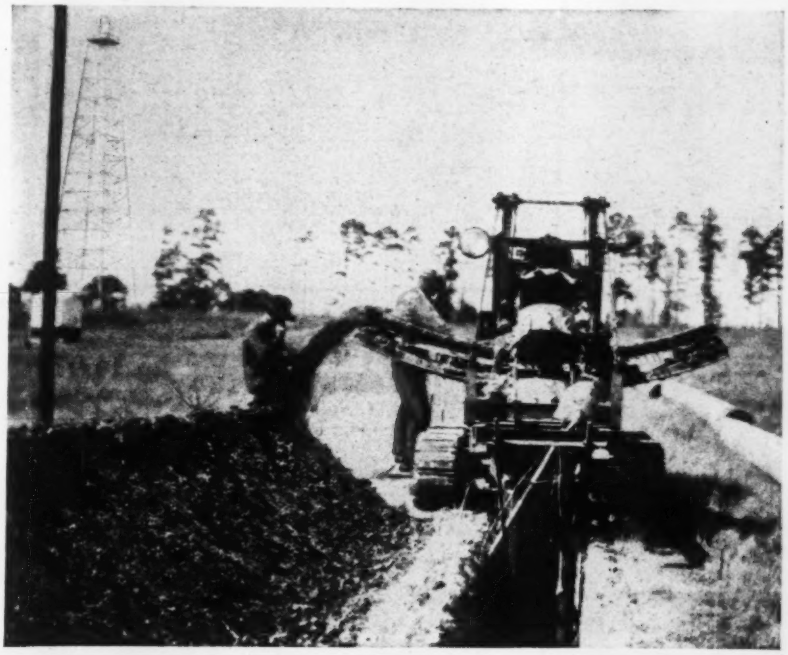

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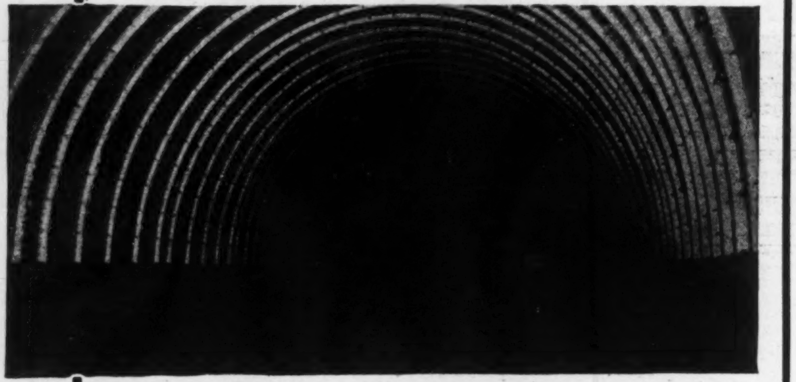

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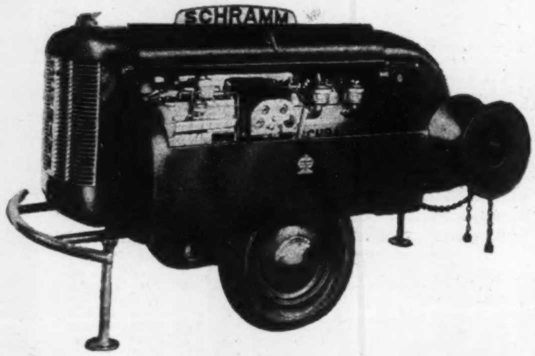

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†California — Bureau Reclamation, Custom House, Denver, Colo., received no bids Dec. 7, gate valves for installing in station service penstocks, Shasta Power Plant, Kennett Div., Central Valley Project, Spec. 1678-[illegible] Shasta Co. CD 11/18—ENR 11/26.

★**†Calif., Pittsburg-Antioch**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 250 unit family housing, Cal-4471, and 275 unit dormitory apartments, Cal-4472, combined in Cal-4471, 250 unit family housing and 275 unit dormitory apartments. CD 11/23—ENR 11/26.

†Colorado — Pub. Housing Auth., NHA, Dierks Bldg., Kansas City, Mo., sketches by T. H. Buell, 730 14 St., Denver, housing. $150,000.

†Colorado — Pub. Housing Auth., NHA, Dierks Bldg., Kansas City, Mo., sketches by T. H. Buell, 730 14 St., Denver, housing.

†Colorado — Pub. Housing Auth., NHA, Dierks Bldg., Kansas City, Mo., sketches by T. H. Buell, 730 14 St., Denver, Colo., housing.

†Colorado — Pub. Housing Auth., NHA, Dierks Bldg., Kansas City, Mo., sketches by T. H. Buell, 730 14 St., Denver, housing.

†Connecticut—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., sketches by Lyons & Mather, 211 State St., and F. C. Anderson and P. P. Petrofsky, both 177 State St., Bridgeport, altering bldgs. for housing. $150,000.

Conn., Bridgeport — J. McLevy, mayor, plans by Lindsay & Johnson, 211 State St., rebuilding 2 brick business bldgs., Main St. $175,000. CD 12/2—ENR 12/10.

†Illinois—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., hemp processing mill. $335,000. Commodity Credit Corp. will operate.

†Illinois—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., hemp processing mill, $335,000. Commodity Credit Corp. will operate.

†Kentucky—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., plant. Over $350,000. Commodity Credit Corp. will operate.

†Md., Sandy Spring—Montgomery County General Hospital, Olney, plans nearing completion by G. L. Howe, 917-15 St. N.W., Wash., D. C., hospital addn., Md 18-160. $180,000. **FWA.** CD 10/29—ENR 11/12, under Olney.

★**†Michigan** — Detroit Housing Comn., 409 Griswold St., Detroit, prefabricated housing, Mich. 20089, for NHA. W. E. Kapp, 730 Buhl Bldg., Detroit, archt.

★**†Michigan** — Pub. Housing Auth., NHA, Barlum Tower, Detroit, plans by Herman & Simons, 131 Lafayette Blvd., Detroit, housing, Mich. 20032, Mich. 20033, and Mich. 20034. Over $500,000. CD 12/9—ENR 10/22.

★**†Mich., Detroit**—Pub. Housing Auth., NHA, Barlum Tower Bldg., 300 unit family housing, Mich-20045. CD 3/19—ENR 3/26.

†Mich., Ypsilanti—Pub. Housing Auth., NHA, Barlum Tower Bldg., Detroit, 100 dormitory housing, Mich-20075-T.

†Mich., Ypsilanti—Pub. Housing Auth., NHA, Barlum Tower Bldg., Detroit, 48 dormitory apartments, Mich-20059. CD 10/16—ENR 10/22 under Detroit.

★**†New Hampshire** — Pub. Housing Auth., NHA, 24 School St., Boston, Mass., indefinitely postponed permanent unit housing, NH 27031, $500,000. CD 12/2—ENR 12/10.

†New Mexico — U. S. Eng., Albuquerque, bldg., covered walks, Luna Co. $50,000.

†North Carolina—Eastern Carolina Regional Housing Auth., Dunn Bldg., Clinton, bids soon, revised plans community and management, maintenance bldg., Project NC 31-032. Bids 10/26 rejected. A. J. Maxwell, Jr., Goldsboro, archt. CD 11/4—ENR 11/2, under LB.

†Ohio—Industrial Company soon lets contract bldg. $400,000. Albert Kahn Assoc. Archts. & Engrs., 345 New Center Bldg., Detroit, Mich., engrs. Defense Plant Corp. will finance.

†O., Dayton — Miami Valley Hospital, 61 Magnolia St., L. H. Ringelspaugh, comptroller, temporary hospital addn. $216,000. **FWA.**

†O., Marion—Marion City Hospital, hospital remodeling and addn. $166,800. **FWA.**

†Oklahoma—U. S. [illegible] 231 W. Main St., Denison, Tex., addn. [illegible]itary housing, etc. Under $100,000.

★**†Oregon** and **Washington** — Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Wash., 360 unit housing Ore-35059; 718 unit family dwellings, Ore-3509[illegible]; 264 unit family dwellings, Ore-35092; 114 unit family dwellings, Ore-35095; 90 unit family dwellings, Ore-35096; 130 unit family dwellings, Ore-35097; 476 unit family dwellings, Ore-35098; 360 unit family dwellings, Ore-35099. Project Ore-25093, 64 dormitory apartments is eliminated. CD 11/11—ENR 11/19.

PUBLIC BLDGS. (Proposed Work, Cont'd.)

★†**Pennsylvania**—Allegeny County Housing Auth., 201 County Office Bldg., Pittsburgh, revised plans by Schwab, Palmgreen & Assoc., 600 Grant St., Pittsburgh, temporary housing and community bldg.,. Pa. 35302, for NHA. E. S. Tower, 213 Investment Bldg., Pittsburgh, engr.

†**Pa., Ambridge**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 400 unit demountable housing. Pa-36302, Beaver Co. CD 10/16—ENR 10/22.

★†**South Carolina**—U. S. Eng., 33 Customhouse, Charleston bldgs., Berkeley Co. $1,000,000.

S. D., Sioux Falls—Sioux Valley Hospital, Euclid and 20 Sts., plans by Hugill and Blatherwick, Boyce Greeley Bldg., hospital addn. $175,000. Applied to FWA.

†**Tenn., Chattanooga** — Tennessee Valley Auth., Knoxville, warehouses and other bldgs. for terminal. $150,000.

★†**Texas**—Pub. Housing Auth., NHA, 1309 Electric Bldg., Fort Worth, plans by Clarkson, Pelich, Geren & Radey, Insurance Bldg., Fort Worth, trailer unit housing, Tex. 41355.

†**Texas**—U. S. Eng., 231 W. Main St., Denison, military bldg., covered walks, Maverick Co. $50,000.

†**Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, bids soon, bldg., covered walks, Webb Co. $50,000. Plans deposit $25.

★†**Tex., Amarillo**—Pub. Housing Auth., NHA, 1309 Electric Bldg., Fort Worth, plans by W. C. Townes, 1208 W. 10 Ave., 210 unit dormitory apartments, Tex.-41362; 150 unit family housing, Tex. 41364; 110 unit dormitory apartments, Tex. 41363; 75 unit dwellings, Tex. 41365. CD 10/23—ENR 10/29.

†**Tex., Orange**—Bd. Educ., Orange, school. $260,600. **FWA** allot.

†**Tex., Paris**—Federal Works Agency, 1309 Electric Bldg., Fort Worth, recreational bldg., facilities, Tex. 41-571, $75,000 available. CD 10/21—ENR 10/29.

†**Tex., San Antonio**—C. K. Quinn, mayor, plans by Spillman & Spillman, Hicks Bldg., health center, Tex. 41-519. $100,000. **FWA.**

†**Tex., Waxahachie**—U. S. Pub. Health Service, 19 St. and Constitution Ave. N.W., Wash., D. C., isolation and clinic bldg., facilities. $41,500. Applied to FWA.

★†**Washington**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, housing, Wash 45172, Wash 45176, Wash 45175, Wash 45177, and Wash 45174.

†**Wash., Olympia**—Federal Works Agency, Alaska Bldg., Seattle, plans by J. H. Wohleb, Chambers Blk., frame nurses home. Docket 45-216. $92,000.

★†**Wash., Tacoma**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, 300 unit dwellings, Wash-45018; 64 unit temporary dormitory apartments, Wash-45019.

★†**Wash., Vancouver**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, 1,000 unit dormitory housing, increased to 1,170 unit housing Wash-45171. CD 11/2—ENR 11/5 under BA.

Wis., Chippewa Falls—State Dpt. P. Welfare, Madison, plans by R. C. Kirchhoff, state archt., Madison, tuberculosis hospital, Northern Wisconsin Colony & Training School. $320,000.

Wis., Milwaukee—School construction, $252,610. J. P. Schwada, city engr.

Wis., Union Grove—State Dpt. P. Welfare, Madison plans by R. C. Kirchhoff, state archt., Madison, school, Southern Wisconsin Colony & Training School. $155,000.

★**Ont., Ottawa**—Dominion Govt., Ottawa, plans by Dpt. P. Wks., Ottawa, frame office bldg., concrete fdn. $800,000. K. M. Cameron, c/o Dpt. P. Wks., Ottawa, engr.

Ont., Stratford—Secretary Dpt. Munitions & Supply, Ottawa, bids soon, converting Juliana Barracks into Basic Training Centre, for Dpt. Natl. Defense (Army), Ottawa, $200,000.

Que., Ste. Anne de Bellevue—Dominion Govt., Ottawa, Ont., plans by E. J. Turcotte, 1010 W. Ste. Catherine St., Montreal, 2½ story, 35x72 ft., rein.-con. addn. Mental Hospital. $150,000. Dpt. P. Wks., Ottawa, Ont.,

BIDS ASKED

Bids Asked After December 14

★†**Virginia** — Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., housing, Va. 44019. Extended date. CD 12/1—ENR 12/3.

★†**Virginia** — Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., housing, Va. 44018. Extended date. CD 12/1—ENR 12/3.

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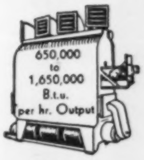

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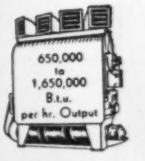

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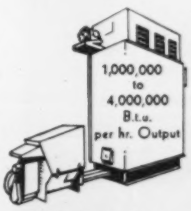

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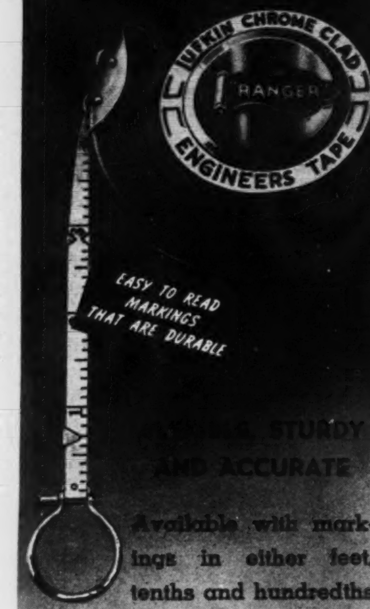

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PUBLIC BLDGS. (Bids Asked, Cont'd.)

★**†Virginia** — Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., dormitory apartments, Va. 44231. Extended date. CD 12/1—ENR 12/3.

Bids Asked December 21

★**†Louisiana**—U. S. Eng., 300 Bway., Little Rock, Ark., bldgs., Spec. 777-43-66. Less than $1,000,000.

Bids Asked December 23

†D. C., Wash.—Pub. Bldgs. Admin., North Interior Bldg., service bldgs. at Natl. Bureau Standards.

Bids Asked

★**†Arkansas**—Pub. Housing Auth., NHA, 1309 Electric Bldg., Fort Worth, Tex., temporary housing, Ark-3049. CD 11/2—ENR 11/5 under BA.

★**†Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., demountable frame housing, Conn. 6057, $1,200,000. Plans deposit $50 for 1st set and $10 each addnl. set. F. H. Beckwith, 115 Wall St., Bridgeport, and J. G. Phelan, 211 State St., Bridgeport, archts. CD 11/27—ENR 12/3.

★**†Connecticut** — Bridgeport Housing Auth., 252 Hallett St., Bridgeport, takes bids 8 days after receipt of priority, dwellings, Conn 6057 for NHA. Plans deposit $50 first set, and $10 for each addnl. set.

★**†Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., housing, Conn. 6129. $1,500,000. Mylchreest & Reynolds, 238 Palm St., Hartford, and Keith Sellers Heine, 101 Mohawk Dr., West Hartford, archts. CD 12/2—ENR 12/10.

★**†Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., housing, Conn. 6134. $1,000,000. M. Moore & C. Salsbury, 967 Farmington Ave., West Hartford, archts. CD 11/27—ENR 12/3.

†Connecticut — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I. (selected list bidders), installing sprinkler sys. bldgs., New London Co. Under $50,000.

†Nebraska—U. S. Eng., 1709 Jackson St., Omaha, remodeling bldgs., Cheyenne Co. CD 12/2—ENR 12/10.

★**†Ohio**—Fisher Body Div. General Motors Corp., 121 General Motors Bldg., Detroit, Mich., superstructure for plant. Federally financed.

★**†Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, addnl. bldgs., $600,000; electrical distr. sys. over $25,000, both in Oklahoma Co. Plans deposit $30 each project.

★**†Pennsylvania**—W. T. Monahan, archt., 406 Marine Bank Bldg., Erie, demountable housing, Pa. 36024. for NHA. $800,000. C. P. Brosch, c/o Architect's Office, Erie, landscape and site archt. G. A. Danielson, 209 Hays Bldg., Erie, mechanical engr. Hill & Hill, North East, civil engr. CD 11/27—ENR 12/3.

†Pa., Rochester—Federal Works Agency, 2 Lafayette St., New York, N. Y., general contract, 3 story, 40x50 ft. hospital addn., Project Pa. 36-167, for Rochester General Hospital, $253,300. J. E. Martsolf, 512 3 Ave., New Brighton, archt. CD 9/11—ENR 9/17.

★**†Texas**—U. S. Eng., Fort Sam Houston, bldgs., Coryell Co. $3,250,000. Total est. $5,500,000. Plans deposit $100. CD 9/25—ENR 10/1.

†Texas—U. S. Eng., Dallas, 1 story, 100 x 160 ft. bldg., No. 257-43-168, Dallas Co. Rollins, Forest & Jameson, Praetorian Bldg., Dallas, archts.

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, housing facilities, frame type bldgs., water, sanitary sewer, gas, electrical distr. sys. extens. and imprvs., etc., McLennan Co. $80,000. Plans deposit $25.

†Wis., Sparta — Dpt. Health & Welfare Service, 105 W. Adams St., Chicago, Ill., recreational bldg., DPW 47-130. $100,000. **FWA.** CD 4/29—ENR 5/7.

LOW BIDDERS

†Alabama—U. S. Eng., U. S. Courthouse & Customhouse, Mobile, bldg., Inv. 569-43-349, Mobile Co., from Foster & Creighton Co., American Natl. Bank Bldg., Nashville, Tenn. Est. **$40,000.**

†California—U. S. Eng., 1209 8 St., Sacramento, Dec. 7, bldg., Spec. 304A, Fresno Co., from Trewhitt-Shields & Fisher, 1501 Pacific Southwest Bldg., Fresno, **$50,000-$100,000.**

†California—U. S. Eng., 1209 8 St., Sacramento, bldg., Spec. 304B, Sacramento Co., from G. W. Williams Co., 10 California Dr., Burlingame, **$50,000-$100,000.**

†Calif., Vallejo—Pub. Bldgs. Admin., North Interior Bldg., Wash., D. C., Dec. 9, excavating, filling, grading, Vallejo Community Hospital, Cal. 4-461, from E. E. Lowell, 1250 Georgia St., **$77,900.** **FWA.** CD 12/3—ENR 7/16.

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

†Idaho—U. S. Eng., Pittock Blk., Portland, Ore., bldgs., sidewalks, drainage, water distr. and sanitary sewer sys., electrical facilities, Power Co., from Kimble Constr. Co., Coeur d'Alene, **$100,000-$500,000.**

†Texas—U. S. Eng., 231 W. Main St., Denison, bldgs., etc., Solic. 257-43-140, Lamar Co., from J. W. Bateson, Box 432, Paris, **$100,000-$500,000.** CD 11/25—ENR 12/3.

†Texas—U. S. Eng., Fort Sam Houston, addnl. bldgs., electrical, gas, sewer, WW distr., etc., Spec. 42-442, Medina Co., from Ideal Home Builders, Rt. 3, Box 405C, San Antonio.

CONTRACTS AWARDED

★**†Alabama** — U. S. Eng., Fort McClellan, bldgs., Calhoun Co., to Dethlefs-Boozer Constr. Co., Anniston, **$500,000-$1,000,000.**

†Alabama—U. S. Eng., 494 Spring St. N.W., Atlanta, Ga., temporary frame bldgs., Calhoun Co., to Atwood Constr. Co., Atlanta., Ga., **$100,000-$500,000.**

†Ark., Pine Bluff—Federal Works Agency, 1309 Electric Bldg., Fort Worth, Tex., 2 story hospital, to Harmon Constr. Co., 1138 N.W. 4 St., Oklahoma City, Okla., **$220,000.** Mitchell-Selligam, Pine Bluff, and Erhart & Eichenbaum, 113½ W. 3 St., Little Rock, archts.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldg. facilities, Monterey Co., to V. H. Moore, 157 Lorimer St., Salinas. Awarded 12/11.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldgs., San Francisco Co., to M. A. Little, 1 Grand View Ave., San Francisco. Awarded 12/11.

★**†California**—Housing Auth. of City and County of San Francisco, 525 Market St., San Francisco, dormitory unit housing, Cal. 4521, to Barrett & Hilp, 918 Harrison St., San Francisco, est. **$500,000;** dwelling units, Cal. 4522, to MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco, est. **$1,000,000,** for NHA. CD 12/8—ENR 12/10.

†California—Industrial Company, bldg., to MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco. Federally financed.

†California—Industrial Company, bldg., to C. M. Teigland, 773 University Ave., Berkeley. Awarded 12/8. Federally financed. CD 11/5—ENR 11/12.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., Monterey Co., to Coast Counties Constr. Co., Salinas. Awarded 12/8.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., Monterey Co., to H. C. Geyer, 787 Munras Ave., Monterey. Awarded 12/7.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., San Mateo Co., to Carl J. Fung & Co., 700 Sacramento St., San Francisco. Awarded 12/8.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldgs., Santa Cruz Co., to R. S. Friend, 309 Stanford St., Watsonville. Awarded 12/7.

†Connecticut — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., temporary frame bldgs., Hartford Co., to E. Turgeon, 614 Turks Head Bldg., Providence, R. I., **$100,000-$500,000.**

†Connecticut and **Massachusetts**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., electrical work for housing, New Haven Co., Conn., to Bar-Craft Electric Co., 571 State St., New Haven, Conn.; electrical work for housing, Bristol Co., Mass., to George G. McKee, Inc., 26 E. 1 St., Mt. Vernon, N. Y., both No. 699-43-77. CD 10/16—ENR 10/22 under CA.

★**†District of Columbia** — Alley Dwelling Auth., 1737 L St. N.W., Wash., D. C., Lily Pond Housing, DC 49054, for NHA, to C. B. Ross Co., Inc., 1643 Conn. Ave. N.W., Wash., D. C., **$1,368,000.** CD 11/27—ENR 12/3, under LB.

†Florida—U. S. Eng., Court House, Jacksonville, bldgs., Inv. Neg. Jax 43-379, to Fred Howland, Inc., 1114 Postal Bldg., Miami, under **$500,000;** paving, hardstands, etc., Inv. Neg.-A.P. 43-3, to W. L. Cobb Constr. Co., 1102 22 St., Tampa, under **$500,000,** both Highlands Co. Awarded 11/21 and 11/23, respectively.

†Florida—U. S. Eng., U. S. Courthouse & Post Office, Jacksonville, miscellaneous bldg., Hillsborough Co., to William I. Sultenfuss, 803 James St., Tampa.

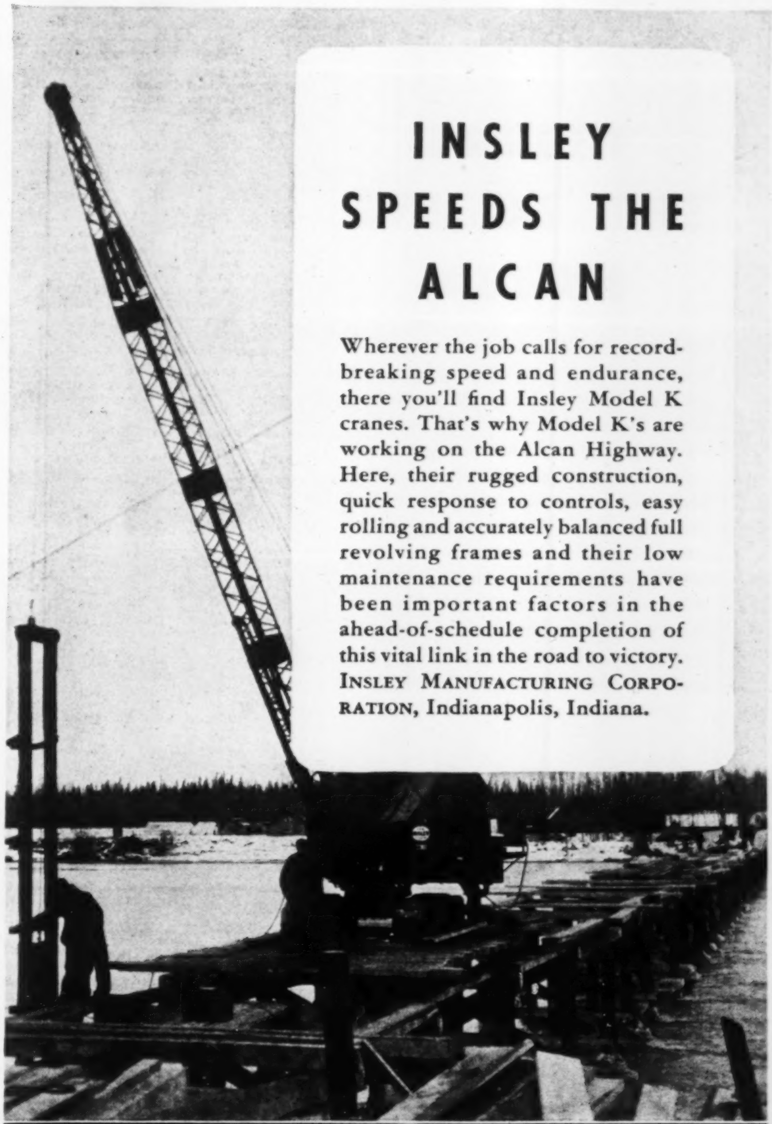
†Florida—U. S. Eng., U. S. Courthouse & Post Office, Jacksonville, addnl. bldgs., Lee Co., to R. E. Clarson, Inc., Power & Light Bldg., St. Petersburg.

†Florida—U. S. Eng., U. S. Courthouse & Post Office, Jacksonville, bldgs., Dade Co., to Lester & Preu, 1440 Alton Rd., Miami Beach.

†Georgia—U. S. Eng., Post Office Bldg., Savannah, addnl. bldgs., Chatham Co., to R. W. Didschuneit, Realty Bldg., Savannah.

†Georgia—U. S. Eng., Marietta, bldg., Cobb Co., to Van Winkle & Co., 275 E. Pace's Ferry Rd., Atlanta.

†Georgia—U. S. Eng., U. S. Courthouse & Customhouse, Mobile, Ala., bldg., Decatur Co., to Jordan Contg. Co., Andrews Rd., Columbus, Ga.



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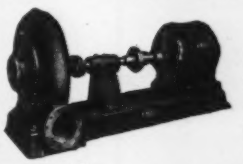

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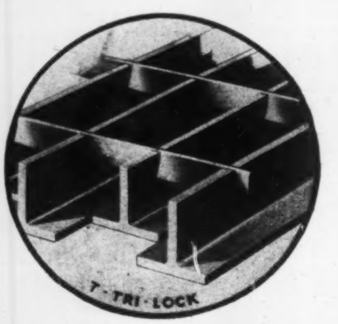

PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†Georgia—U. S. Eng., 494 Spring St. N.W., Atlanta, bldg., Fulton Co., to Black & Shaw, 161 Spring St. N.W., Atlanta.

†Illinois—U. S. Eng., 520 Merchandise Mart, Chicago, temporary frame bldgs., Will Co., to Chell & Anderson, Inc., 176 W. Adams St., Chicago, **$100,000-$500,000.**

★ **†Kentucky**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., plant, to Engineering Staff of B. F. Goodrich Co., 500 S. Main St., Akron, O., construction, to Batson & Cook, West Point, Ga. Prack & Prack, Martin Bldg., and Chester Engineers, 210 B. Park Way, both Pittsburgh, Pa., engrs. Blaw Knox Co., Farmers Blvd., Pittsburgh, Pa., process engr. Est. **$4,000,000.** National Synthetic Rubber Corp. (Goodall Rubber, Inc., Hamilton Rubber Mfg. Co., Hewitt Rubber Corp., Lee Rubber & Tire Corp. and Minnesota Mining & Manufacturing Co.), will operate. CD 12/11 under CA—ENR 12/10.

★ **†Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, bldg., to Tudor & Ratcliffe, Alexandria, under **$1,000,000.**

★ **†Louisiana**—Industrial Company, sewer line, to American Heating & Plumbing Co., 829 Baronne St., New Orleans, under **$1,000,000.** Federally financed.

†Maryland—Industrial Company, bldgs., to Davis Constr. Co., 9 W. Chase St. Est. exceeds **$40,000.** Federally financed.

★ **†Maryland**—Alley Dwelling Auth., 1737 L St. N.W., Wash., D. C., demountable housing, MD. 18086, to V. R. Beauchamp, Ridge Rd. and C St. S.E., Wash., D. C., for NHA. Est. **$1,332,000.** CD 11/13—ENR 11/19.

★ **†Maryland**—Alley Dwelling Auth., 1737 L St. N.W., Wash., D. C., demountable housing Montgomery Co., for NHA, to Arlington Fabrication Co., Arlington, Va. Est. **$1.939,125.** CD 11/13—ENR 11/19.

†Md., Branchville — Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 60 residences, Oak Springs subdivision, to Allen C. Minnix, 1416 F St. N.W., Wash., D. C. Est. **$300,000.**

★ **†Md., Suitland**—Alley Dwelling Auth., 1737 L St. N. W., Wash., D. C., Carry Houses, Md-18083, for NHA, to Standard Houses, Inc., 225 Bway., New York, N. Y. Est. **$1,500,000.** CD 11/13—ENR 11/19.

†Massachusetts—Industrial Company, bldg., to Daniel Marr & Son Co., 384 Dorchester Ave., Boston, Mass. Federally financed.

†Massachusetts—Industrial Company piping boiler plant, to C. N. Flagg & Co., Inc., 79 Griswold St., Meriden, Conn., **$61,600.** Federally financed.

†Massachusetts—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., bldg., No. 699-43-106, Hampden Co., to Ley Constr. Co., 1215 Main St., Springfield. Est. **$50,000-$100,000.** Bids 11/12. CD 11/10.

†Massachusetts — U. S. Eng., Park Square Bldg., Boston, bldg. alterations, No. 175-43-Neg. 162, Norfolk Co., to C. C. Temple, 184 Boylston St., Boston, under **$50,000.** Bids 12/3. CD 12/2.

†Massachusetts—U. S. Eng., Park Square Bldg., Boston, plumbing in bldgs., various locations, to Bowdoin Plumbing & Heating Co., 107 Charles St., Boston. Est. under **$50,000.**

★ **†Michigan**—Pub. Housing Auth., NHA, Barlum Tower, Detroit, housing, to Hunkin-Conkey Constr. Co., 1740 E. 12 St., Cleveland, O. Est. **$9,500,000.** CD 12/11—ENR 10/8.

★ **†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, officers quarters, Chippewa Co., to A. H. Proksch, Iron River, less than **$1,000,000.**

★ **†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, storage bldgs., Macomb Co., to P. M. Sterling, 114 Liberty St., New York, N. Y. less than **$1,000,000.**

★ **†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, altering G. E. Bldg., to Industrial Constr. Co., 5315 Seminole St., Detroit, less than **$1,000,000;** plumbing, heating and ventilating, to Glanz & Killian, 1761 W. Forest St., Detroit, less than **$1,000,000***** electrical work, to Triangle Electric Co., 40 Custer St., Detroit, less than **$1,000,000** all foregoing in Wayne Co.

★ **†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, fire station, Alpena Co., to A. H. Proksch, Iron River, less than **$1,000,000.**

★ **†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, fire stations in Alpena, Crawford and Iosco Counties, to Spence Bros., 203 Brewer Arcade, Saginaw, Strom Constr. Co., 452 Houseman Bldg., Grand Rapids, and A. H. Proksch, Iron River, less than **$1,000,000.**

†Mississippi — Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., dormitory apartments, Miss. 22027, to Newton & Glenn, Hattiesburg, **$176,999.** Bid 12/4, awarded 12/5. CD 12/2—ENR 10/29.

†Nevada—U. S. Eng., Wright Bldg., Sacramento, Calif., bldgs., Spec. 309 and 319, Nye Co., to Haddock Constr. Co., 3578 E. Foothill Blvd., Pasadena, Calif. Est. exceeds **$1,000,000.**

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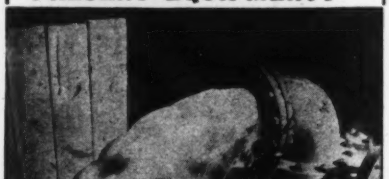

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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†**New Jersey**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 1 story, brick addns. to each of 6 boiler plants, to Green Constr. Co., 110 E. 42 St., New York, N. Y. Coward Eng. Co., 411 Cooper St., Camden, engr. Bids 11/10.

†**New Jersey**—U. S. Eng., 120 Wall St., New York, N. Y., bldgs., Middlesex Co., to Fatzler Co., Inc., 653 S. 15 St., Newark, **$100,000-$500,000.**

†**New Jersey**—U. S. Eng., 120 Wall St., New York, N. Y., addnl. bldgs., Bergen Co., to Brown & Matthews, Inc., 122 E. 42 St., New York, N. Y., **$100,000-$500,000.**

†**New Jersey**—U. S. Eng., 120 Wall St., New York, N. Y., 1 story, brick bldg., Middlesex Co., to Interboro Heating Co., 109 E. 29 St., New York, N. Y. Est. **$50,000.**

†**New York**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., mfg. bldg., to Bushwick Bldg. Co. Inc., 25 Willoughby St., Brooklyn. Est. **$250,000.** M. Klein, 67 Court St., Brooklyn, archt.

★†**New York**—Schenectady Municipal Housing Auth., Schonowee Village, 402 Millard St., Schenectady, general construction housing, NYS-14, incl. heating, plumbing, electrical work, except lawns and planting, for NHA, to Stein Constr. Corp., 551 5 Ave., New York, **$1,384,000.** CD 11/25—ENR 12/3 under LB.

†**North Carolina**—U. S. Eng., Monroe, bldg., Union Co., to W. H. Hand & Son, Belmont.

†**North Carolina** — U. S. Eng., Charlotte, bldgs., grading, electrical distr., water supply, Mecklenburg Co., to Barger Bros., Mooresville.

†**Ohio** — Industrial Company, brick, steel, concrete bldg., to S. N. Nielson, 3059 W. Augusta St., Chicago, Ill. Defense Plant Corp. will finance.

†**Ohio**—U. S. Eng., Wright Field, Dayton, bldgs., Greene Co., to G. W. Timmons, 1293 E. Broad St., Columbus, **$200,000-$300,000.** CD 9/18—ENR 9/24.

★†**Oregon**—U. S. Eng., Pittock Blk., Portland, bldgs., Deschutes Co., to Smith, Wright & Hoffman, 715 S.W. Columbia St., Portland, approx. **$4,000,000.** Awarded 12/8. CD 11/7—ENR 11/19.

†**Pennsylvania**—U. S. Eng., P. O. Box 511, Butler, Group 2 bldgs., Butler Co., to Moyer Bros., Beale Ave. and 26 St., Altoona. CD 12/7—ENR 12/10, under CA.

†**Pennsylvania**—U. S. Eng., 6 and Walnut Sts., Phila., bldgs., Berks Co., to Fred J. Brotherton, Inc., Atlantic and Newman Sts., Hackensack, N. J., **$100,000-$500,000.**

★†**Tennessee**—U. S. Eng., 306 U. S. Courthouse, Nashville, bldgs., Montgomery Co., to Foster & Creighton Co., American Natl. Bank Bldg., Nashville, under **$1,000,000.**

†**Texas** — Pub. Housing Auth., NHA, 1309 Electric Bldg., Fort Worth, temporary dormitory housing, Tex. 41332, and electrical distr. sys., for permanent housing, Tex. 41331, to Thurman & Ostrom, P. O. Box 1070, Borger, approx. **$244,000** and **$47,000** respectively. CD 11/2—ENR 11/5.

†**Texas**—U. S. Eng., Fort Sam Houston, electrical work for bldg., Bexar Co., to Allen Electric Co., 125 North St., San Antonio, **$19,280.** CD 12/1—ENR 12/3, under CA.

†**Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, bldgs., Howard Co., to Schneider Const. Co., 3004 W. Dallas St., Houston, **$100,000-$500,000.** CD 11/30—ENR 12/3.

†**Texas**—U. S. Eng., Fort Sam Houston, bldg., Bexar Co., to Jim Handley, Inc., 720 Travis Bldg., San Antonio, under **$50,000.** CD 11/30—ENR 12/3.

†**Texas**—U. S. Eng., Albuquerque, N. M., bldgs., underground utilities, etc., Presidio Co., to McGough Bros., 603 Bankers Mtg. Bldg., Houston, **$100,000-$500,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, addnl. bldg., Brown Co., to C. H. Oehler, 5007 Bway., Galveston, under **$50,000.**

★†**Texas**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., addnl. plant facilities, to Foster-Wheeler Corp., 624 Shell Bldg., Houston, **$2,500,000.** Industrial Company will operate. H. Lloyd, 2006 W. Alabama Ave., Houston, archt.

†**Texas** — Industrial Company, laboratory bldg., to Fluor Corp. Ltd., Mellie Esperson Bldg., Houston, **$73,200.** Federally financed.

†**Texas**—Industrial Company, plant addn., to A. Ness Constr. Co., 200 Portwood St., Houston, **$100,000.** Federally financed.

†**Texas**—U. S. Eng., Fort Sam Houston, military housing, Bexar Co., to C. L. Browning, Jr., 812 Insurance Bldg., San Antonio, over **$150,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, bldgs., Bexar Co., to G. W. Mitchell, 612 Builders Bldg., San Antonio, over **$100,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, bldgs., underground water distr. sys., gas, sanitary sewer, electrical sys., steam distr. sys., steam heating, utilities sys., fencing, flexible base, walks, roads, culverts, etc., Spec. 42-438, Bexar Co., to V. Prassel, 808-9 Builders Exch. Bldg., San Antonio, over **$400,000.**

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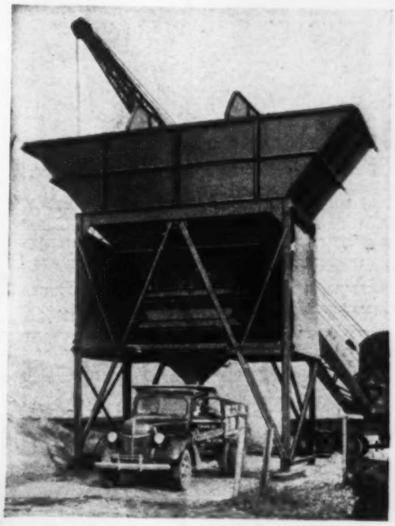

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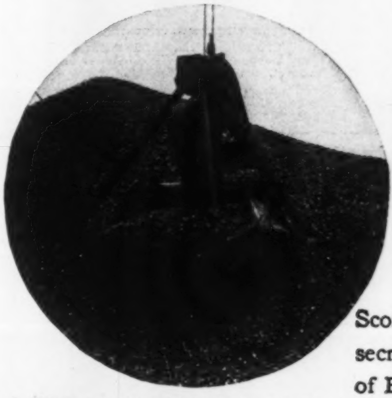

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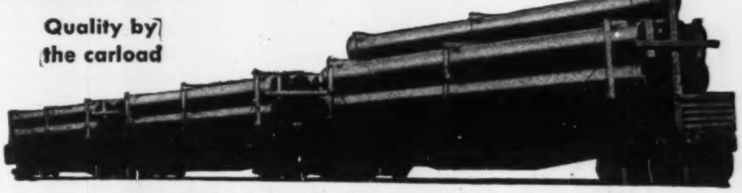

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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†Texas—U. S. Eng., Fort Sam Houston, bldg., Brown Co., to C. H. Oehler, 5007 Bway., Galveston, under **$50,000.**

†Texas—U. S. Eng., Fort Sam Houston, addnl. concrete for bldgs., Brown Co., to Holland Page, Georgetown Rd., Austin, **$100,000-$500,000.**

†Texas—U. S. Eng., Albuquerque, N. M., temporary frame bldgs., El Paso Co., to Ponsford Bros., El Paso, **$100,000-$500,000.**

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, frame type bldgs., McLennan Co., to Thos. Bate & Sons, 1107 Girard St., Houston, **$100,000-$500,000.** CD 11/30—ENR 12/3.

†Utah—U. S. Eng., 32 Exchange Pl., Salt Lake City, insulating bldgs., Weber Co., to Johnson-Leck, 502 Templeton Bldg., Salt Lake City, under **$60,000,** Bids 11/30; railroad shed, Weber Co., to W. C. Smith Co., 216 Bd. Trade Bldg., Portland, Ore., under **$60,000.** Bids 11/27.

★**†Washington**—King County Housing Auth., County-City Bldg., Seattle, housing, Projects Wash. 45161, 45138 and 45139, for NHA, to Moore & Roberts, 305 Lloyd Bldg., Seattle, **$2,499,777.** Bids 12/2, awarded 12/7. CD 12/7—ENR 12/10, under LB.

†Washington—U. S. Eng., 800 3 Ave., Seattle, recreational facilities, Pierce Co., to A. G. Homan, 112 N. Franklin St., Olympia, **$100,000-$500,000.**

†Wisconsin—U. S. Eng., 408 Federal Bldg., Milwaukee, bldgs., Dane Co., to Patrick Warren Constr. Co., 228 N. LaSalle St., Chicago, Ill., **$100,000-$500,000.**

Wis., Racine — Bd. Vocational & Adult Educ., Racine, 1 story, 110x150 ft., brick school, concrete fdn., to Bondgard Constr. Co., 1135 Mound Ave. B. Wade Denham, 1520 Washington Ave., archt.

N. S., Pictou—Wartime Housing Ltd., 55 York St., Toronto, Ont., 100 addnl. houses, Beaches Rd., to Eastern Woodworkers, Ltd., New Glasgow, about **$225,000.**

Que., St. Malo (P. O. Quebec City)—Dpt. Munitions & Supply, Ottawa, Ont., addn., repairing R.C.O.C. workshop, to Francois Jobin, Inc., 88 St. Louis Rd., Quebec City, **$60,000.**

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., San Francisco—Halsted & Co., 1123 Sutter St., plans by Wm. G. Merchant, 406 Russ Bldg., 2 story, frame mortuary bldg., 19 Ave. $40,000.

Mass., Southbridge—Hogan Realty Co., c/o J. Hogan, American Optical Co., Southbridge, plans by J. D. Hulslander, 25 Foster St., Worcester, 36 frame houses, $162,000. CD 11/17—ENR 11/19.

Neb., Sidney—Jay E. Siderler, Midland Savings Bldg., Denver, Colo., 60 residences. $200,000.

N. J., Camden—Menotti Aristone, 24 St. and Marlton Ave., seventy 1½ story, frame, brick homes. $280,000.

Pennsylvania—Caste Bros., 422 Cochran Rd., Mt. Lebanon. plans nearing completion by Wm. C. Young, 524 4 Ave., Pittsburgh, one hundred four 2 story, bsmnt., brick veneer, residences, Baptist Rd., McKee, Fieldcrest, Windvale and Greenridge Drives, Baldwin Twp., Allegheny Co. B. H. Aires, Maloney Bldg., Pittsburgh, sewer and paving engr.

Pa., Bethayres—Crescent Homes, Bethayres, 25 single homes, 2 duplex units for 6500 Hasbrook Ave.; 30 unit housing in 6000 block, Hasbrook Ave.

Pa., New Kensington—Chas. Lefkowitz (Central Drug Co.) 1st Natl. Bank Bldg., rebuilding two 3 story, bsmnt. commercial bldgs., probably brick. $150,000.

Pa., Oakmont—Lewis Arnold, 456 North Ave., plans completed twenty-three 2 story, bsmnt., 24x26 ft. brick veneer residences. $138,000.

Pa., Phila.—G. Shugerman, 2229 S. Fairhill St., 42 two story, stone, brick, 142x240 ft. housing on north side of Sanger St., and 165x244 ft. on north side of Carver St., all west of Ditman St.

Wash., Vancouver—F. C. von Gortler, 1411 4 Ave. Bldg. Seattle, plans by E. W. Morrison, 719 Second Ave. Bldg., Seattle, theatre bldg., bowling alley. $200,000. CD 12/4—ENR 12/10.

B. C., Trail—Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, prepared plans 47 houses, school, hospital, womens quarters, watermains, etc., Finch Lake. $153,540.

N. S., Springhill—All Saints Hospital, Springhill, plans prepared for 45x244 ft. hospital, less 50 ft. in length off each end until needed, two 2 story, 45x135 ft. rear wings, etc., brick, concrete, concrete fdns. $301,500. CD 5/27—6/4.

Que., Jonquiere—R. Taplin, 382 St. Dominique St., commercial and apartment block. $150,000.

Ont., Ottawa—R. McClelland, 49 Frank St., dwellings. $5,000 each.

Que., Hampstead (Postal Dist. Montreal)—Dakin Engineering Ltd., 444 Beaumont Ave., Montreal, dwellings. About $4,500 each.

Que., Quebec City—Victoria Hotel Co., Ltd., 56 St. John St., plans by Amyot-Bouchard & Rinfret, 105 Mountain Hill, hotel. $150,000. CD 9/29.

CONTRACTS AWARDED

Calif., Compton—G. G. Gregory, [illegible]001 W. Spruce St., fifty-one frame, stucco dwellings, 600, 700, 800 and 900 Blocks on [illegible]thwood and Tajuata Aves. Owner builds. $191,000.

N. J., Avenel—Homestead Ridge Development Co., 850 Broad St., Newark, [illegible]ty-four 2 story, brick, frame homes, separate contracts, **$168,000.** M. Kimmel, 850 Broad St., Newark, archt. CD 9/10—ENR 9/17.

N. J., North Arlington (br. Arlington)—Skyline Gardens, Inc., 28-62 Central Ave., Clifton, nine 1 and 2 story, brick, frame garden apartments, to Amico Constr. Co., 144 Lawrence Ave., Hasbrouck Heights, **$400,000.** [illegible] Kelly, 921 Bergen Ave., Jersey City, archt.

Pennsylvania — Mt. Royal Building Co., V. Neal, pres., Kleber Rd., Glenshaw, revised plans by Wm. N. Denton, Jr., 1719 1 St. N.W., Wash., D. C., one hundred seventy-six 2 story, bsmnt., brick, tile, residential development, Mt. Royal Manor Plan, Shaler Twp., separate contracts. CD 6/9—ENR 6/11 under Pittsburgh, CA.

Pa., Phila.—Berman Bilt Homes, 6032 Market St., 43 unit housing, 75 St. between Buist and Elmwood Aves. Owner builds. $175,000.

Tex., Corpus Christi—E. R. McDaniel, Corpus Christi, 30 or more frame type dwellings, appurtenances, underground utilities. Owner builds. **$150,000.**

Tex., Fort Worth — Fillingim Constr. Co., White Settlement Rd., 1 story dwellings, underground utilities, own forces. $150,000. CD 12/7.

Tex., Houston — Schulte-United Store, 501 Main St., Houston, bldg. unit, to Southwest Const. Co., 3802 Calhoun Rd., approx. $190,000. CD 12/4.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Johnsondale—SAWMILL—Mt. Whitney Lumber Co., Porterville, rebuilding sawmill. Over $50,000.

Tex., Terrell—FREIGHT DEPOT, etc.—Southern Pacific Ry. Co., R. W. Barnes, ch. engr. (Southern Pacific Lines, Texas and New Orleans R.R. Co.) Southern Pacific Bldg., Houston, new freight depot, warehouse, storage facilities.

Wis., Cadott—FACTORY—G. Hamm, Cadott, rebuilding cheese factory. $40,000.

B. C., Ainsworth—MINE—Wartime Metals Corp., c/o Dpt. Munitions & Supply, Ottawa, Ont., reconstructing Florence Mine, $100,000. H. A. Rose, Bridge River, engr.

B. C., Nanaimo—PLANT—Canadian Bakeries Ltd., Nanaimo, plant. $50,000.

B. C., Nelson—MINING PLANT, etc.—Florence Mining Co., Ltd., 459 Baker St., mining plant and bldgs. $50,000.

B. C., Nelson—MINING—Reco Mountain Base Metals Mines, Ltd., 459 Baker St., mining bldgs., etc. $50,000.

B. C., Paldi—SAW MILL—Mayo Bros. Timber Co., Ltd., Paldi, saw mill, etc.

B. C., Penticton — CANNERY — Canadian Canners Ltd., Penticton, cannery. Over $50,000.

B. C., Rossland—MINING—Bayonne Consolidated Gold Mines, Ltd., Rossland, mining bldgs., etc. in Stoney Creek Area (Scheelite development). $50,000.

B. C., Trail—PUMP HOUSE—Consolidated Mining & Smelting Co., Ltd., Trail, extenpump house, etc. $90,000.

B. C., Vancouver—MILL—Garibaldi Sawmills Ltd., 475 Howe St., saw mill, etc.

B. C., Vancouver—SAW MILL—North West Bay Logging Co., Ltd., 601 Royal Trust Bldg., saw mill. $50,000.

B. C., Victoria—FACTORY—Fraser Valley Fibre Flax Co-operative Assn., c/o Ministry of Agriculture, flax factory. $85,000.

Ont., Acton—PLANT—Beardmore & Co., Ltd., Acton, remodeling plant addn. $40,000.

Ont., Bourget—PLANT—La Co-operative Laitiere de Bourget, Bourget, dairy plant.

Ont., Lansing—FOUNDRY—Lansing Engineering Ltd., c/o Jas. L. Cassidy, Paris, iron foundry, etc.

Ont., Leamington—COLD STORAGE PLANT—H. J. Heinz Co., Leamington, plans by Hutton & Souter, 36 James St., Hamilton, 1 story, concrete block cold storage bldg. $40,000.

Ont., Ottawa—PLANT—Brading Breweries Ltd., 451 Wellington St., plans by T. G. Ferguson, 297 Victoria St., Toronto, remodeling portion plant.

Ont., Ottawa — PLANT — Dominion Power Equipment Co., Ltd., c/o Angus McMillan, Oakville, plant. $40,000.

Ont., Ottawa—PLANT—Ottawa Car & Aircraft Co., Ltd., Slater St., remodeling portion plant. $50,000.

INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

Ont., Toronto—PLANT—Canada Bud Breweries Ltd., 296 Simcoe St., plans by T. G. Ferguson, 297 Victoria St., remodeling plant, water tank, etc.

Ont., Toronto—PLANT—Canadian Streatite Co., Ltd., c/o G. S. Saunderson, 90 W. King St., plant. $50,000.

Ont., Toronto—PLANT—Cosgraves Dominion Brewery Ltd., 293 Niagara St., plans by T. G. Ferguson, 297 Victoria St., remodeling portion plant. $40,000.

Ont., Toronto — PLANT — Gutta Percha & Rubber Co., Ltd., 28 W. Lodge Ave., plant addn. $40,000.

Ont., Toronto—MINING, etc.—International Uranium Mining Co., Ltd., c/o H. K. Campbell, 3 Macdonnel St., mining development bldg., crushing plant, e[illegible] 70,000.

Ont., Toronto — PLANT — Nusign Electric Ltd., c/o E. G. Black, 6[illegible] [illegible]onge St., plant.

Ont., Toronto—PLANT—O'Keefe's Brewing Co., Ltd., 297 Victoria St., plans by T. G. Ferguson, 297 Victoria St., remodeling portion plant, renewing water lines. $40,000.

Ont., Toronto—PLANT—W. G. Smith, Ltd., 200 Fairbanks Ave., plant reconstruction.

Ont., Waterloo—PLANT—Carling Breweries Ltd., 155 King St., plans by T. G. Ferguson, 297 Victoria St., Toronto, remodeling portion plant, repairing water softening plant. $40,000.

Ont., Windsor—PLANT—Aircraft Hydraulic Supplies, Ltd., Windsor, plant. $40,000.

Ont., Windsor — PLANT — British American Brewing Co., Ltd., 130 Bruce St., plans by T. G. Ferguson, 297 Victoria St., Toronto, remodeling portion plant.

Que., Jonquiere—FACTORY—Tremblay Express, 152 St. Francois St., rebuilding factory. $50,000.

Que., Lauzon—STORAGE—Jean Branchesi, Quebec City, storage bldg., Boucher Blvd. and Jodoin St. $84,900.

Que., Levis—GARAGE, etc.—Belzil Garage Co., 101 Commercial St., 50x100 ft. garage and repair shop.

Que., Levis—FACTORY—Perreault & Co., 97 Commercial St., cheese and dairy products factory. $40,000.

Que., Longueuil—PLANT—Dominion Eng. Wks., Ltd., 7 1st Ave., plant addn., oil storage depot. $50,000.

Que., Montreal—PLANT—Dominion Tar & Chemical Co., 3547 Allard St., 40x120 ft., brick, plant addn., concrete fdn. $40,000.

Que., Montreal—PLANT—Ross & Macdonald, archts., 1010 St. Catherine St. W., bids soon plant boiler house, dope and paint storage bldg., cafeteria, for Canadian Power Boat Co., Ltd., 4000 St. Patrick St. $130,000. D. Sheppard, 57 Bloor St. W., Toronto, Ont., engr. CO 12/7.

Que., Notre Dame du Lac — FACTORY — Co-operative Society, J. A. Beaulieu, Notre Dame du Lac, flax factory. $50,000.

Que., Quebec City — BAKERY — J. Vaillancourt Estate, 328 St. Joseph St., reconstructing bakery, St. Joseph and St. Anselme St. $100,000 incl. equip.

Que., St. Jerome—PLANT—Dominion Rubber Co., Ltd., 550 Papineau Ave., Montreal, plant addn. $40,000.

Que., St. Laurent (Postal Dist. Montreal)—PLANT—Industrial Glass Wks. Co., Ltd., 57 Ouimet St., remodeling plant. $40,000.

BIDS ASKED

Massachusetts — PLANT — Bethlehem Steel Co., E. Howard St., Quincy (from selected bidders), plant. $40,000.

Rhode Island—PLANT—U. S. Rubber Co., 355 Valley St., Providence plant addn.

Tex., Corsicana — STEAM ELECTRIC STATION—Texas Power & Light Co., Corsicana, exten., Trinidad steam electric station, 30 mi. east of here. Over $40,000.

★ **Tex., Houston**—PLANT—Nyotex Chemical Co., c/c C. F. Dunasky, M. Esperson Bldg., Houston, lime and chemical manufacturing plant. $6,000,000 complete project.

Ont., Merritton—PLANT—Alliance Paper Mills, Merritton, 2 story, 28x60 ft., brick, plant, Lybster Div. $50,000. CD 5/15.

CONTRACTS AWARDED

Calif., Sunnyvale — FACTORY — Joshua Hendy Iron Wks., Henry Ave., addns. 3 bldgs., to Mac Donald & Kahn, Inc., 200 Financial Center Bldg., San Francisco, L. H. Nishkian, 155 Sansome St., San Francisco, engr. CD 12/15/41—ENR 12/18/41.

Conn., Stamford — FACTORY — Reflectone, Inc., 67 Greenwich Ave., altering factory, 114 Manhattan St. Owner builds. Electrical work, etc., to J. Urman, 29 Weed Ave. CD 12/2—ENR 12/10.

Illinois — PLANT — Industrial Company, bldgs., to Consolidated Constr. Co., 9 S. Clinton St., Chicago, Albert Kahn Associated Archts. & Engrs., Inc., 345 New Center Bldg., Detroit, Mich., engrs.

Mo., St. Louis—FACTORY—Century Electric Co., 1806 Pine St., 1 story, bsmnt., 109x180 ft., brick, glass brick, terra cotta, tile factory,

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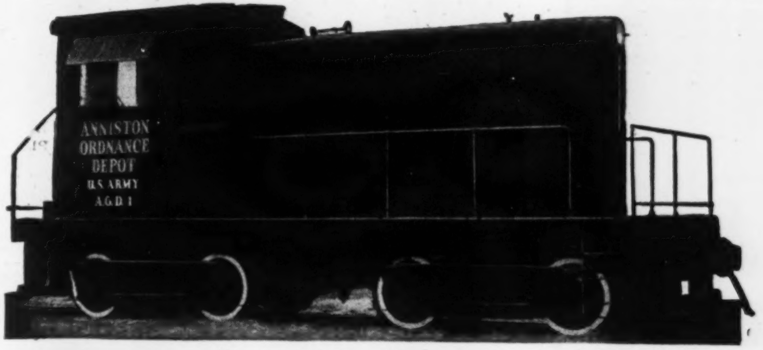

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INDUSTRIAL BLDGS. (Contr[illegible] Awarded, Cont'd.)

Chestnut St. between 18 and 19 [illegible] to John B. Gutmann Constr. Co., 821 [illegible]nwright Bldg., **$97,313.** Bids 12/3. CD [illegible]—ENR 12/3.

N. J., Newark—PLANT—E. I. [illegible] Pont de Nemours, Jersey Ave., New Brunswick, 3 story, brick, concrete block chemical mfg. bldg. addn., to Rogers & Sons Con[illegible] Co., 71 John St., New Brunswick, $40,000; electrical work, to Buhl & Caffrey, Inc., 35 H[illegible]on St.

O., Cleveland—FACTORY, et[illegible] International Metal Hose Co., A. H. M[illegible], pres., 10709 Quincy Ave., 1 story, 75 x [illegible] ft. and 30 x 80 ft., brick factory, office [illegible] storage bldg., to Sam W. Emerson Co., [illegible] Euclid Ave. Est. **$40,000.** Bonfield & [illegible]mings, 1900 Euclid Ave., archts. Awarde[illegible]4.

Pa., Knox—WAREHOUSE—Knox [illegible]s Bottle Co., R. R. Underwood, pres., Kn[illegible] 1 story, steel, sheet metal warehouse, own for[illegible]

Pa., New Brighton—PLANT—Brighton Clay Products Co., W. H. Schwartz, pres. Pinney St., Rochester, 3 story, 40x50 ft. factory, 1 story 40x75 ft. machine shop, repairing other bldgs. Owner builds. Est. **$75,000.** CD 12/8—ENR 12/10.

Pa., Phila.—PLANT—F. C. Castell[illegible] & Co., F St. and Erie Ave., 145x310 ft. mfg bldg., office and garage, to Henry E. Baton, Inc., 1717 Sansom St., Phila., **$40,000.** CD 11/24—ENR 12/3.

Tex., Beaumont — PLANT — Pure Oil Co., Beaumont, 9¾ ft., 150 ft. rein.-con. chimney for plant under construction. at Smiths Bluff, near here, to Rust Engineering Eng. Co., Clark Bldg., Pittsburgh, Pa. **$72,000.**

Tex., Dallas—FACTORY—Mid-City Realty Co., P. O. Box 598, 20x400 ft., factory bldg. unit, re-modeling, etc., automatic sprinkler sys., air conditioning, electrical facilities, wiring, etc., to Henger Const. Co., Dallas Natl. Bank Bldg., Dallas, approx. **$92,000.** CD 12/7—ENR 12/10.

Tex., Houston—PLANT FACILITIES, etc.—American Pipe & Constr. Co., 4635 Firestone Bl., Southgate, Los Angeles, Calif., Lockjoint Pipe Co., Ampere. N. J. and Houston, Tex., steel storage and plant facilities, 500 Blk. N. Greenwood, to P. Pertelsen, 2803 University Blvd., **$76,500.**

Tex., Lufkin—PLANT—B. L. Zeagler Lumber Co., Lufkin, reconstructing sawmill, force account. **$80,000.** CD 12/4—ENR 12/10.

Wis., Beloit—STORAGE—Fairbanks Morse & Co., Beloit, 1 story, 97x100 ft., frame storage bldg., concrete fdn., to Cunningham Bros., 359 E. Grand Ave. W. Fred Dolke, 189 W. Madison St., Chicago, Ill., archt.

Wis., Columbus—GARAGE—Hivey Transfer Co., 208 Water St., general and electrical contract 1 story, 48x74 ft. brick block garage, concrete fdn., to F. E. Salzwedel, 145 E. James St.

Wis., Elkhorn—COLD STORAGE, etc.—Elkhorn Locker Service c/o Elkhorn Lumber Co., 1 and 2 story, 40x60 ft. and 22x64 ft. cold storage locker and office bldg., day labor. J. J. and Thos. H. Flad, 133 Langdon St., Madison, archts.

Wis., Juneau—MILL—Atlas Hemp Mills, Juneau, 1 story, 40x48 ft. and 32x38 ft. concrete block mill addns., concrete fdns., to Rohde-Kapelle Co., Mayville; electrical work, to Pluckhan Electric Co., Juneau. A. Kuenzi, Watertown, engr.

Wis., West Allis (br. Milwaukee)—SHOP—Allis-Chalmers Mfg. Co., 1126 S. 70 St., 3 story, 18x68 ft., brick, concrete shop addn. between Bldgs. 4 and 5, to Meredith Bros., Inc., 121 E. Washington St., Milwaukee. C. E. Meyer, c/o owner, archt.

Wis., West Allis (br. Milwaukee—ASSEMBLY, etc.—Wisconsin Motor Corp., 1910 S. 53 St., design and construction 1 story, bsmnt., 128x134 ft. frame assembly and stockroom, concrete fdn., to Klug & Smith Co., 111 E. Wisconsin Ave., Milwaukee.

Ont., Oakville—PLANTS—Barringham Rubber Co., Ltd., Reynolds St. N., brick, concrete plants, own forces. Est. **$150,000.**

Ont., Toronto—PLANT—Aluminum Co. of Canada, Ltd., 158 Sterling Rd., wing addn. to plant, 2 story, rein.-con. office bldg., Etobicoke Twp., to A. W. Robertson, Ltd., 57 Bloor St. W. Toronto, about **$100,000.** J. C. Meadowcroft, 1154 Beaver Hall Hill, Montreal, Que. archt.

Ont., Walkerville — PLANT — Canadian Bridge Co., Ltd., 7 Walker Rd., 1 story, 70x75 ft., steel frame plant addn., concrete fdn., to Hein Constr. Co., Ltd., 172 Aylmer Ave. Est. **$40,000.**

Ont., Windsor—SUBSTATION—Ford Motor Co. of Canada, Ltd., 2780 E. Sandwich St., 38x14 ft., 13,800 volt substation, concrete underground in foundry, own forces. **$180,000.** CD 12/11 under East Windsor.

Que., Montreal—PLANT—Blocktube Co. Ltd., 5460 Bordeau St., plant bldg. alterations, addn. to C. Carpenter & Co. Ltd., 5139 Decarie Blvd., about **$40,000.**

★ **Que., Three Rivers** — PLANT — Aluminum Co. of Canada, Ltd., Sun Life Bldg., Montreal, industrial plant, to Fraser-Brace Engineering Co. Ltd., 360 S. James St. W., Montreal, about **$3,000,000.**

For Proposal Advertisements see p. 165 & 180

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P-171, Engineering News-Record
330 West 42nd St., New York City

WANTED

DESIGNERS

Large fabricating plant needs experienced structural steel designers. Draft classification C-A. Excellent opportunity for promotion.

P-159, Engineering News-Record
330 West 42nd St., New York City

WANTED

Young man trained to design and sell structural steel.

Excellent opportunity for promotion as branch office manager. Must have first class references and not subject to immediate draft.

P-160, Engineering News-Record
330 W. 42nd St., New York City

WANTED

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Experienced in Government fixed fee contracts, frame construction. Must be very capable.

P-231, Engineering News-Record
330 West 42nd St., New York City

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BOX NUMBER

When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It is our only means of identifying the advertisement you are answering.

POSITIONS VACANT

These Positions Vacant advertisements are published subject to agreement by the advertisers not to consider applicants now employed on war work unless they obtain written release from present employer.

WANTED—Graduate Civil Engineers—preferably with from two to five years general experience—as field engineers in connection with Water Waste Surveys, Distribution Studies and Trunk Main Surveys of Municipal Water Distribution Systems. The Pitometer Company, Inc., #50 Church Street, New York City, N. Y.

WANTED—Registered professional engineer or architect preferably with experience as estimator and contact man. Must have ability to estimate work, handle negotiations and aggressively supervise construction. Must be available immediately. Thomas Bryan & Associates, Inc., Mobile, Alabama.

EXPERIENCED WATER FILTRATION PLANT SUPERINTENDENT

Wanted to assist in supervising existing 10 MGD rapid sand water filtration plant for the time being, with the purpose of assuming full charge of another plant of equal size expected to be completed in 1943. Location Maryland near Washington, D. C. Should have several years experience in charge of rapid sand filtration plant and not liable to be called in draft. Man with technical training preferred but not essential. State salary desired and give experience and training in first letter. Address same to Harry R. Hall, Chief Engineer, Washington Suburban Sanitary Commission, Hyattsville, Maryland.

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POSITIONS WANTED

4 YEARS AS DEPUTY, Marion County Surveyor; 16 Years Field Engineer and Assistant City Engineer of the City of Indianapolis, on all types of surveys and construction; registered professional engineer; 43 Years old, married, 2 children. Available after December 15th of this year. PW-182, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

ESTIMATOR or General Supt. 50. Swedish, graduate C. E. 25 years experience general building construction including general carpenter foreman. PW-209, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

STRUCTURAL Engineer, graduate office engineer, New York City, completing third defense project designing steel, timber, concrete. PW-183, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CIVIL ENGINEER; Graduate; 33 years experience; design, construction; Industrial plants; Water supply; Hydro-electric developments. PW-36, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

RELIABLE PLUMBING SUPERINTENDENT desires position with a reliable firm. Can layout and supervise any project large or small. Will go any place in the U. S. A. Excellent references supplied upon request. Write or wire to H. J. Burgess, 1002 Lee Ave., Ottumwa, Iowa. Tel. Ottumwa 2044.

STRUCTURAL ENGINEER. Graduate C.E. Licensed N. Y., N. J., Pa. and Conn. 28 years designing and supervising all types of structures; concrete, steel, and timber. For past 18 years in charge of own organization as Consulting Engineer. Designed and supervised more than 50 million dollars worth of construction. Age 49. Perfect health. Fully qualified to take charge of project or drafting room. Was last employed as Chief Engineer on large defense job. At present available. Desire position as Chief Engineer or project manager. PW-135, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

PROJECT MANAGER. Client Laison, structural designer, 24 years experience designing and supervising buildings. Married, 48, Protestant. Available about December 1st. Conscientious cooperative. Raymond Martin, 45 Garretson Road, White Plans, N. Y.

CONSTRUCTION SUPERINTENDENT 20 years varied experience. Have proven record of ability to get difficult work completed rapidly and economically. Best references. Location immaterial. PW-224, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

ASSISTANT SUPERINTENDENT or General Carpenter foreman, with 30 years of technical and practical experience on Dry Docks, Bridges, Dams and Buildings open for immediate engagement. Just completed 2nd Defense Job on docks. Prefer job where production counts. Best references available. Will go to foreign countries. PW-210, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

STRUCTURAL DESIGNER and construction superintendent. Graduate civil engineer 20 years experience industrial commercial buildings, subways, highways etc. Seeks permanent connection contractor or consulting engineer in office or field. Will Travel. PW-241, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

(Continued on the following page)

Watch—
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POSITIONS WANTED

(Continued from preceding page)

ACCOUNTANT & AUDITOR, available January 1st. Age 54 years. 25 years construction accounting experience in the field and office. PW-217, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

STRUCTURAL ENGINEER, 22 years experience, advanced stress analysis and design, working drawings and details, complete projects in Reinforced-Concrete, Steel, Timber, etc. Desires position. PW-235, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

GENERAL SUPERINTENDENT or project manager 25 years experience on all kinds of light and heavy structures recently in charge of low cost and Defense Housing also Airport Bases location immaterial, can manage more than one project. PW-238, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CONSTRUCTION SUPT. and Estimator. Highly experienced in Detailing, Pre-Cutting, Pre-Fabrication and Erection Gov. frame buildings. All types. Thoroughly capable in Office or Field. PW-232, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CHEMIST-ENGINEER, administrative position. Twelve years one position, petroleum refining, manufacturing, road construction. Not subject to military service. Available immediately. PW-236, Engineering News-Record, 330 W. 42nd St.. New York, N. Y.

PROJECT MANAGER—Thirty-two years expèrience—Major in U.S. Reserve, Eng. 1924-1929, Captain World War, constructed 10,000 bed hospital at Savaney, France—Chief Architest first two Low cost Housing Projects, Louisville, Ky. Resident Director Nichols General Hospital, Louisville, Ky., Dec., 1942. Registered in Kentucky, Indiana, West Virginia. Member American Institute of Architects 1916 to date. Four years Cornell University, eight months study in Europe. Immediate service, this country or abroad. E. T. Hutchings, 1722 Heyburn Bldg., Louisvile, Ky.

TECHNICALLY TRAINED electrical engineer. Experience in operation, construction, design, maintenance, and research. Five years in charge of specialized electrical oil field service equipment and personnel. Testing engineer for complete electrical equipment. Married. One child. Will go anywhere. Desire permanent location. PW-239, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

EXECUTIVE Position Wanted—Estimator-Accountant: Twenty years' experience: purchasing materials, supplies; financial; statistical; unit, production cost; governmental procedure. Speaks, reads, writes, German, Spanish, some Japanese. Minimum salary $6,000. Now employed executive position; can get release. 3A; travel anywhere. PW-240, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

STRUCTURAL DESIGNER: Anywhere in South America. Speaks Spanish. Two and one-half years experience building Venezuelan oil terminals. All types of structures. American, U. S. passport, 29 years old, excellent health, single, can travel anywhere. A.B. and M.F.A. in architecture. Can furnish States references. Available immediately. PW-233, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

EXECUTIVE, Superintendent of construction field operations, buildings, bridges, water works, etc., available immediately. PW-237, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

DIRECTOR of purchasing expediting traffic. Thorough knowledge of procurement proceedure on fixed fee. Contracts available at once. Location immaterial. PW-243, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

MASTER MECHANIC OR ASSISTANT — 20 years experience large engineering firms, on heavy construction and installation of equipment — power houses, tunnels and bridges. Go anywhere. PW-161, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

POSITION WANTED

CONSTRUCTION EXECUTIVE

Broad experience in construction and design of reinforced concrete and steel structures, coffer dams, heavy foundations, and airports. That experience extends to negotiations with subcontractors, owners, engineers, and Government. Foreign experience. Interview arranged in New York or Boston.

PW-186, Engineering News-Record
330 W. 42nd St., New York City

POSITIONS WANTED

PROJECT MANAGER or general Superintendent 52, 25 years responsible charge of Dock, Bridge, Shipway, Drydock, Bulkhead, Dam, Foundation, Cofferdam, and allied Construction. Three large government contracts completed this emergency. Go anywhere. PW-212, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

WORK WANTED

SUBCONTRACTOR. Specializing in pre-fabrication and erection Gov. Frame Buildings. Any size or type. Go anywhere. Also, complete system installed and personally supervised on percentage of profit basis. WW-223, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

EQUIPPED SURVEY PARTIES for all types of survey or construction work. Any location. Harwood, 258 Broadway, New York City.

ENGINEERING ORGANIZATION AVAILABLE for design, supervision or field survey service. Old established concern with current experience on five large War Department projects including airports, warehouses, buildings, roads, railroad facilities, sewerage, water supply and utilities. Ample survey equipment and personnel. Fee or contract basis. Address WW-227, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

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PATENTS, TRADE-MARKS, Booklet, "General Information Concerning Inventions and Patents' and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 454, 815 10th St., N. W., Washington, D. C.

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WW-242, Engineering News-Record
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Notice to Advertisers

Because of the Holiday, New Year's Day, January 1st, the "Searchlight" pages of the

DECEMBER 31st ISSUE OF

ENGINEERING NEWS-RECORD

Close for press earlier than the usual closing time

The cooperation of advertisers is solicited in forwarding new copy, or changes of copy, to reach us accordingly.

FINAL CLOSING TIME
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For Rent Advertising—Page 181